

American Artisan

and Hardware Record

Sheet Metal Work-Warm Air Heating

Vol. 95, No. 5

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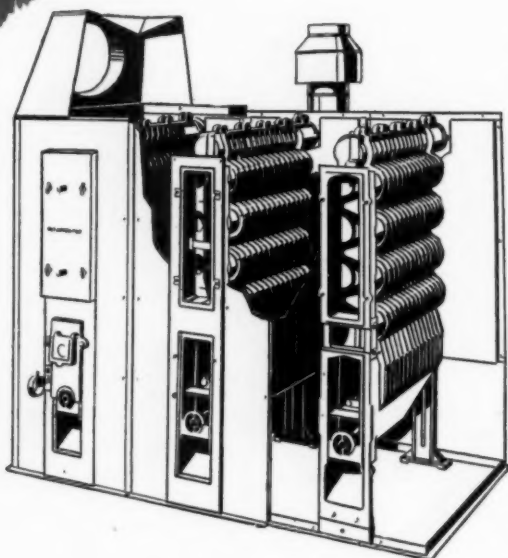
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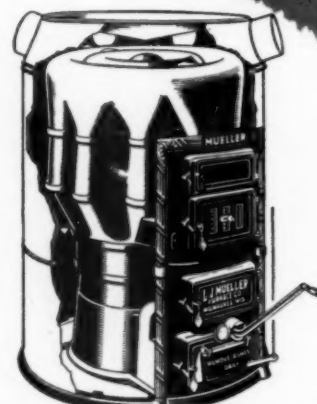
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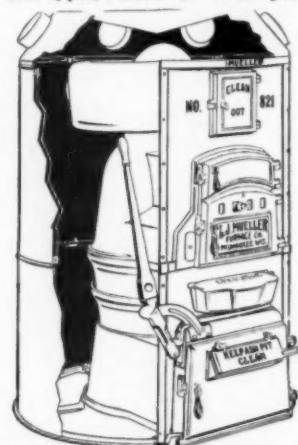
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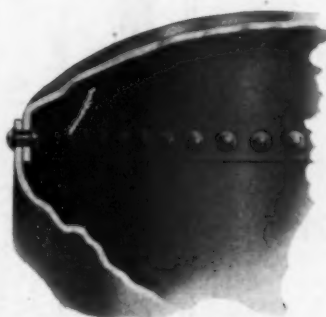


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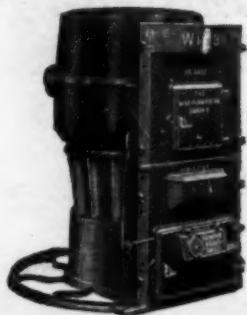
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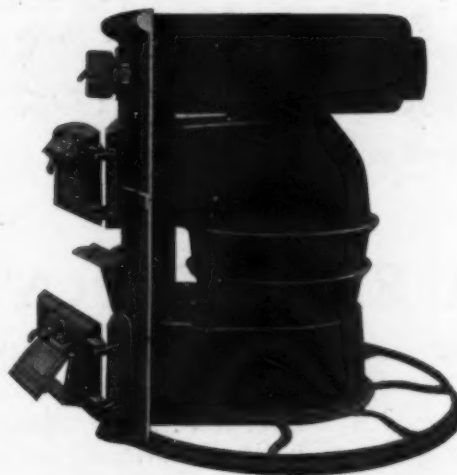
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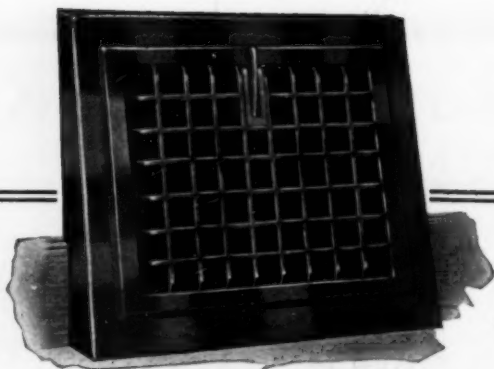
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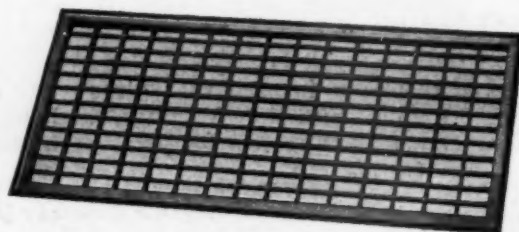
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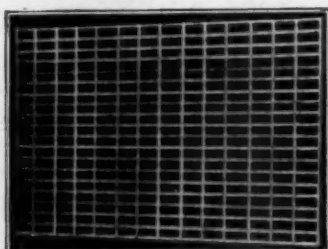
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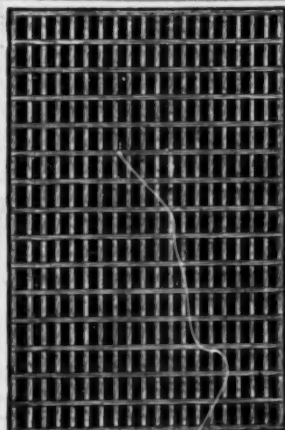
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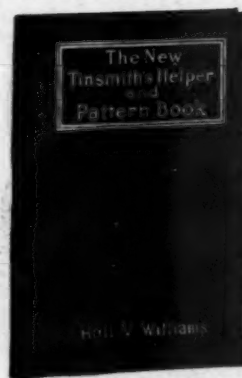
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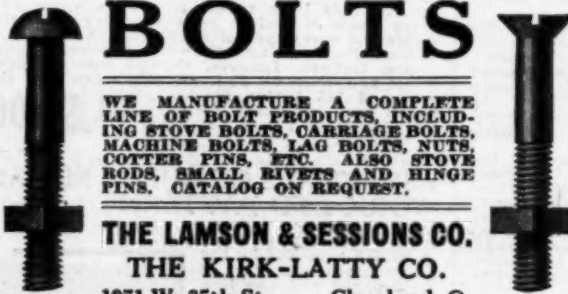
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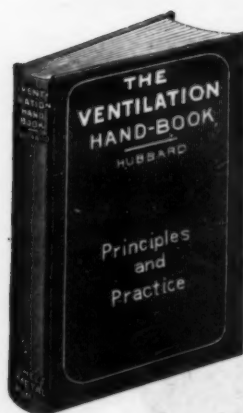
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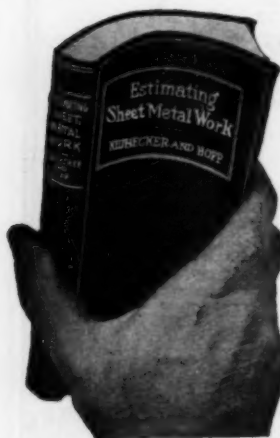
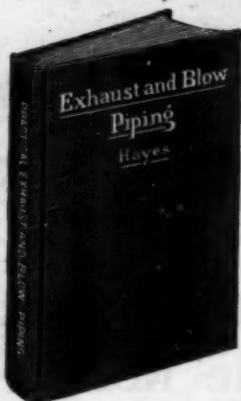
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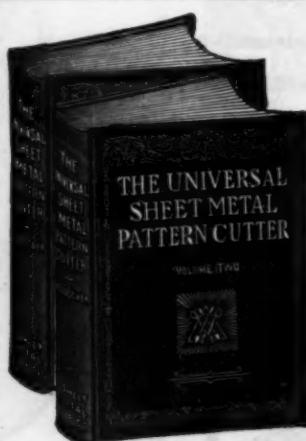
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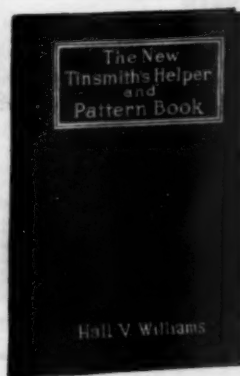
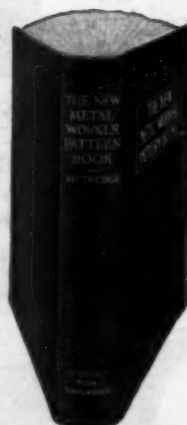
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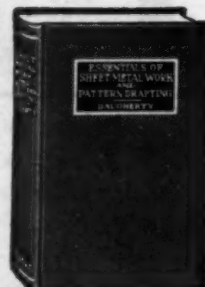


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FLEETING FORTUNE

"The advice of Noor ad Deen Ali to his son in Arabian Nights.

"Oppress no one, lest Fortune oppress thee, for the fortune of this world is one day for thee and another against thee, and its goods are but a loan to be repaid. Be merciful to all, as thou on mercy reckonest; for no hand is there but the hand of God is over it, and no oppressor but shall be worse than the oppressed. Keep therefore thy wealth, that it may keep thee, and watch over it, that it may watch over thee. Squander not thy substance, or thou wilt come to need.

"When a rich man grows poor, his lustre dies away, like to the setting sun that pales with ended day. Absent, his name is not remembered among men; present, he hath no part in life and its array. He passes through the streets and fain would hide his head and pour out floods of tears in every desert way. By Allah; when distress and want descend on men, but strangers midst their kin and countrymen are they."

—From Ingot Iron Shop News.

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Situated in Detroit, we are strategically located to give Service, and we want our friends to look upon us as a convenient and satisfactory source of supply. Large manufacturing facilities and abundant stocks of raw materials permit us to give the kind of service our customers want and can depend on.

Our business owes its success to two factors—Quality of Material and Service—and upon this basis we solicit your business.

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our cans*

*"In the Interest of
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*A booklet
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Warm Air Furnace Industry Sees Big Future in Forced Air Heating

IT IS with the deep satisfaction that inheres to any pleasant task that we doff our hats to the Warm Air Heating industry and pay tribute to it for the splendid spirit of co-operation with which it is entering into the development of Forced Air Heating.

How whole-heartedly it is co-operating is evidenced by the fact that the number of Forced Air Heating jobs for 1927 exceeded 1926 by a considerable margin on quality of contracts, size of buildings and number of sales.

And this in a year which was generally spoken of as a "poor year for sales". Already evidence has reached us that 1928 will greatly outstrip 1927 because furnace manufacturers and dealers everywhere are manifesting a new eagerness in the development of their own business

and today there exists a much larger body of trained, informed, forced air heating experience, available for correct installation.

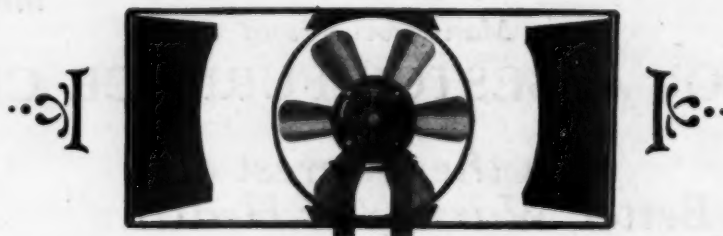
Many manufacturers, distributors and dealers have expressed their resolute determination to utilize to the utmost the selling advantages opened through the use of Forced Air in summer to provide a home cooling and ventilating system.

This of course portends a new development in spring and summer sales of warm-air furnaces.

We are grateful to the industry for its cordial and enthusiastic acceptance of the Miles Automatic Furnace Fan and in turn we affirm our determination to continue to assist in every way within our power and pledge ourselves to do our utmost to continue to merit your loyal, friendly co-operation.

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6521 CEDAR AVENUE
CLEVELAND, OHIO



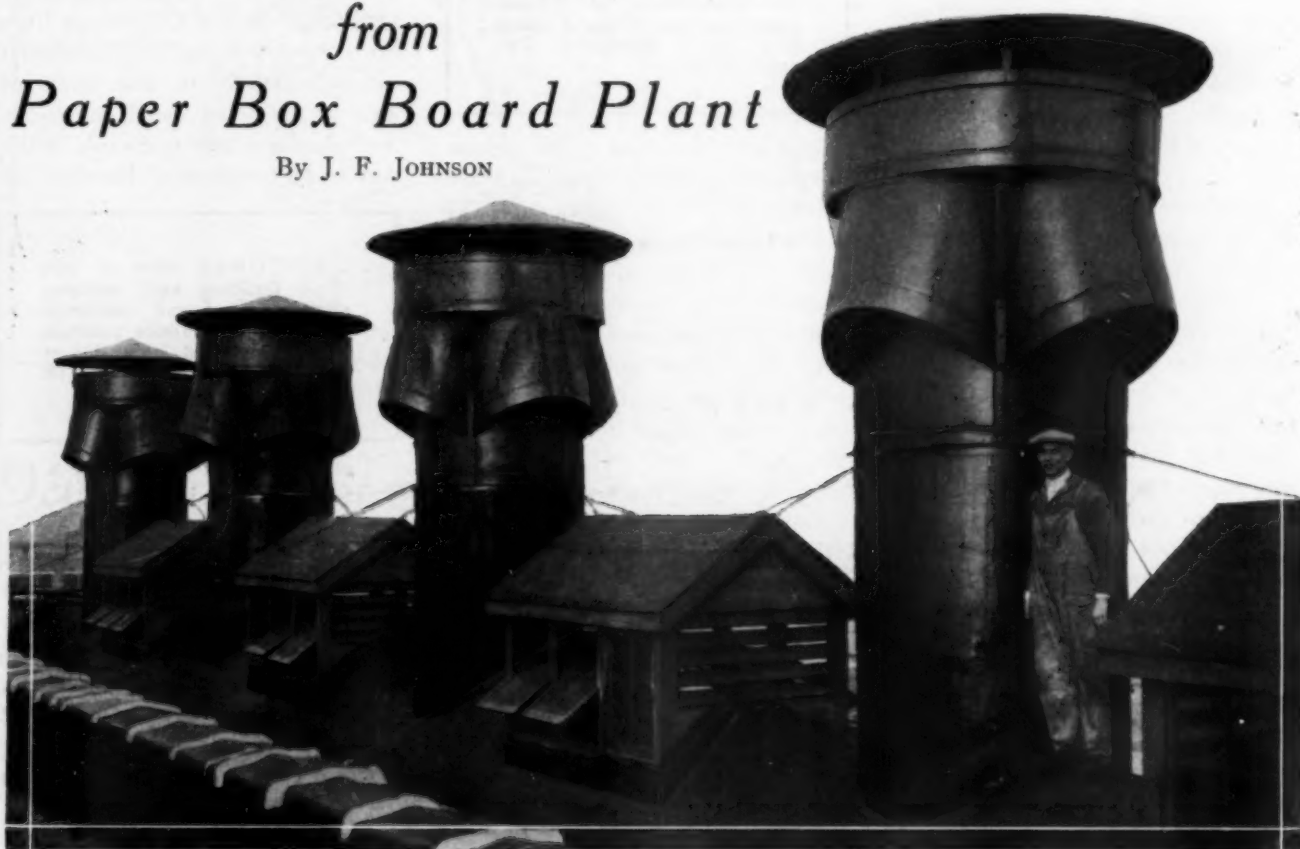
Miles Automatic Furnace Fan with
patented by-pass louvers



Gravity Siphonage Ventilators Efficiently Exhaust HEAT, FUMES & VAPOR

from Paper Box Board Plant

By J. F. JOHNSON



HERE is another example of sheet metal ventilating work that will set the progressive contractors on the trail of similar prospects in their territory.

The Kellogg Box Board Company, Chicago, were confronted with a problem that was seriously hampering the efficiency of their plant.

In the making of paper box board it is necessary to run the paper pulp through a machine consisting of a series of rolls or dryers. In the Kellogg plant this machine is 125 feet long.

The dryers contain heat, and the manufacturing process causes an

ILLUSTRATION shows four of the six 60-inch Siphonage Ventilators used on the installation. Each ventilator weighs about 1500 lbs. They are made of 18-gauge galvanized iron painted with Black Bitumastic Solution Acid-Resisting Paint. Size of Ventilators can be realized by comparing with Larry Stethas, maintenance man at the plant.

excessive amount of heat, fumes and vapor to contaminate the air.

A raised walk extends the length of the machine close to the rolls, and on this it is necessary for the operators to walk to watch the

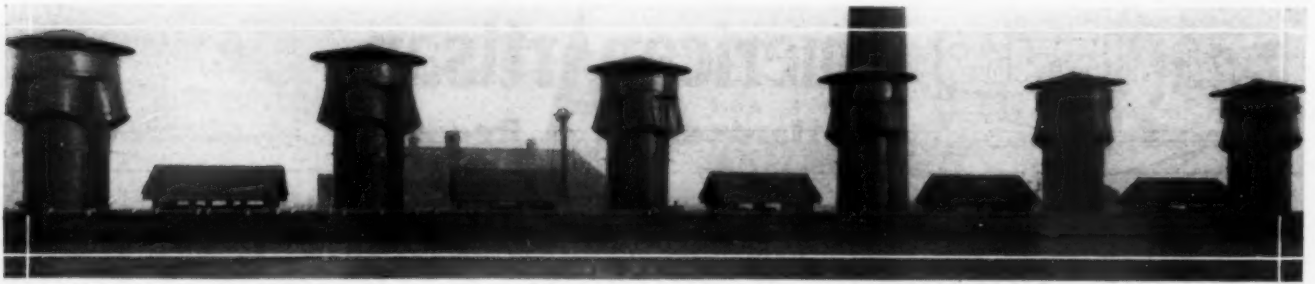
progress of the paper going through the dryers.

Even one totally unfamiliar with this process can readily realize from the foregoing that in order to provide even a minimum amount of fresh air a great deal of the rising fumes, vapor and heat must be carried off.

V. D. Simons, an authority on paper-mill engineering, recommended Siphonage Ventilators.

It was shown that siphonage ventilation would take off an unusually large amount of the vapor and increase the fresh air supply.

With a good air supply and the resultant improved working condi-



tions increased production could be expected and with more pleasant working conditions the men would not only work better, but their health would be better.

In every business it is not only desirable and necessary, but also profitable, to lessen the chances of employees losing time because of illness.

In this instance it was a large factor and any great improvement in working conditions would prove a good investment.

The factory changes recommended by Mr. Simons called for a fairly large expenditure of money and a considerable loss of operating time, yet the siphonage ventilator idea was sold to the Kellogg people in spite of these obstacles.

A new roof was built and a large hood which runs the length of the machine was erected directly above it.

This hood is directly connected to six large stacks which extend through the roof and above all surrounding walls.

Akrat siphonage ventilators are used on these stacks to draw the excess heat, fumes and vapor which rise into the hood.

It is claimed that this installation has reduced the temperature and is providing fresh air so that employees are operating without fear of fume sickness and without loss of time formerly suffered because of excessive heat.

Few manufacturers in the past have been able or willing to acknowledge that they lost money when their employees were off on account of ill health. They generally took the short-sighted view of the matter and thought if the men do not work they are not paid.

In large-scale production, however, where one or two men are

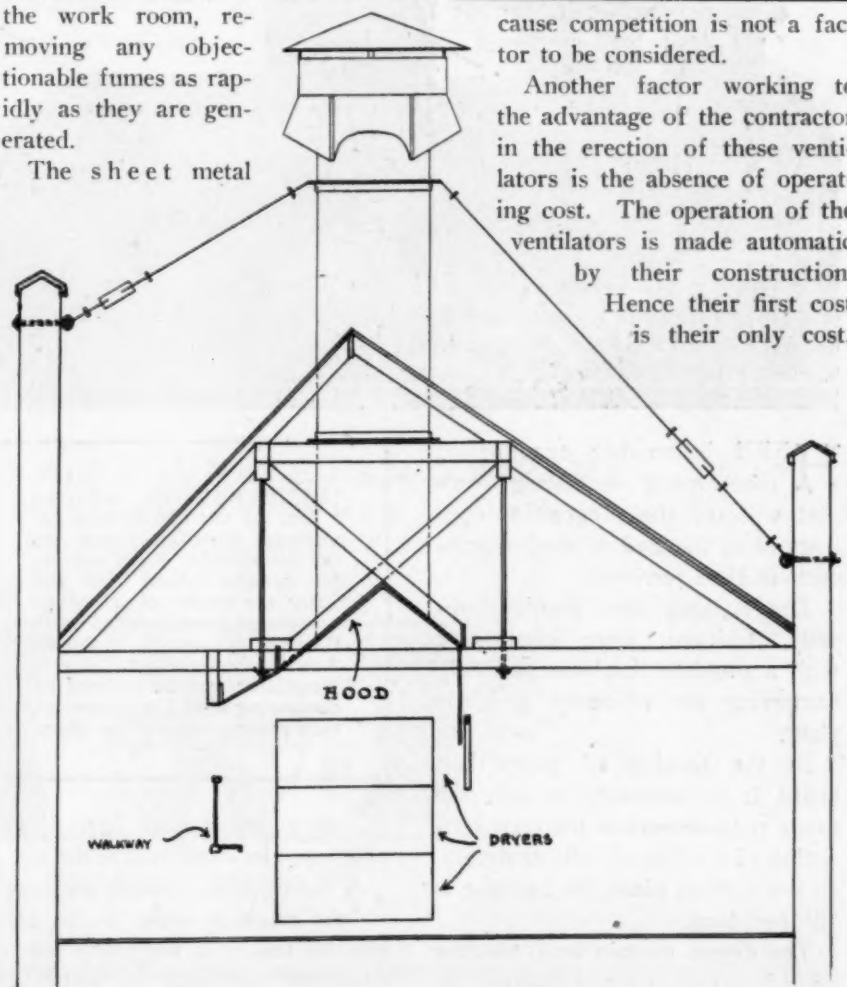
VIEW showing the six Akrat Siphonage Ventilators used to carry away fumes and vapor from the 125-foot paper machine of the Kellogg Box Board Company, Chicago, Illinois.

absent from the chain of production it means that all the other men are handicapped and production is slowed up all along the line. Therefore, it is to the advantage of the employer to maintain conditions that will insure good health to his employees. One of the ways in which this can be done is to keep an adequate supply of fresh air in the work room, removing any objectionable fumes as rapidly as they are generated.

The sheet metal

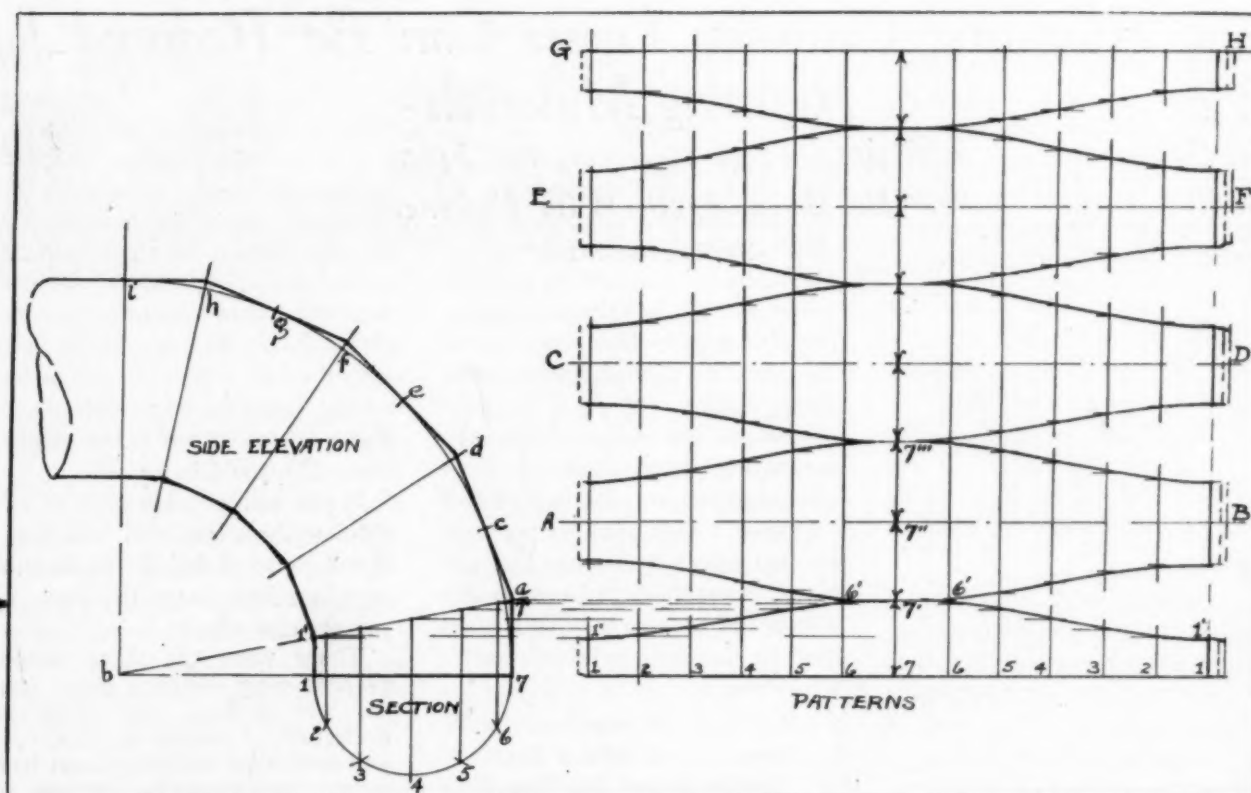
contractor who is desirous of creating business for his firm can do it to a great advantage by suggesting the installation of such devices as the ventilators shown. Oftentimes there are laws compelling the installation of such ventilators, and these are aids to the sheet metal contractor. Such business that is created in this way is the best kind of business, be-

SECTIONAL view of end of building and machine showing hood and ventilator construction. Notice position of walkway and how lips of hood are designed to catch all rising fumes and vapors.



cause competition is not a factor to be considered.

Another factor working to the advantage of the contractor in the erection of these ventilators is the absence of operating cost. The operation of the ventilators is made automatic by their construction. Hence their first cost is their only cost.



Patterns for Leader Pipe Elbows

Developing Pattern for Leader Pipe Elbows Used on Rain Water Spouts

*Pattern Developed at Special Request of
D. G. Mickley, Chambersburg, Pennsylvania*

By O. W. KOTHE, Principal St. Louis Technical Institute

RESPONDING to the inquiry of D. G. Mickley of Chambersburg, Pennsylvania, for the development of patterns such as used for rain water spout elbows—the enclosed diagram will show how this is done. This same principle may be used and applied, no matter what the size of elbow, or the sweep. So first draw a right angle as b-7-b-i, and then describe the quarter circles for the throat and heel of elbow. You can make the throat radius, b-1, anything you desire, but it should not be made less than the diameter of elbow, and in most cases $1\frac{1}{2}$ diameters is better.

Next determine the number of pieces you wish for the elbow to have. In our case we have a five-piece, and so we divide that in eight equal spaces, and draw radial

lines to b, which establishes the miter lines. If you wish a four-piece elbow—then divide the heel arc in six equal spaces, and if you wish three-piece elbows, divide heel in four equal spaces. The first radial line will be the miter line, and is all we need. Next describe the half section and divide in, say, six equal spaces, and from each of these points erect lines to intersect the miter line b-a as between points 1'-7'.

Now the bottom pattern can be developed the same as any ordinary elbow. We pick the girth from the section and step it off as on the line 1-1, and then erect stretchout lines indefinitely. After this we can carry horizontal lines over from each point in miter line b-7', and this develops the first pattern with

miter 1'-7'-1'. Observe, this pattern can be cut out of a stiff piece of paper, or of light tin, and by simply reversing the pattern the other patterns can be marked off in a similar manner.

Where dividers are used for transferring distances, then we pick the heel 7-7', and set it as 7'-7'' and draw line A-B. Then with dividers set off the pattern again on each side of this line A-B. This, you will see, makes the middle gore pieces twice as long as the end gores, and establishes the high point 7''. After this the same process can be continued, thus establishing line C-D, and then E-F and later G-H. It is well to only cut the pattern to points 6'-6', which leaves a straight heel equal to the distance shown.

How Rust and Corrosion Losses Can Be Reduced by Refining Materials

What Once Has Been Done Can Be Done Again With Patience

By GEORGE STECK*

SHEET metal is one of the most generally used commodities in modern life. It touches us on every hand. Sheet metal enters either directly or indirectly into the construction of almost everything we use, from the ponderous battleship to the tiniest toys with which our children play.

Locomotives, cars, agricultural implements, furniture, kitchen utensils; in fact, we practically live, move and have our being surrounded by sheet metal, 90 per cent of which is made from iron ore.

\$500,000,000 Is Lost Every Year Through Rust and Corrosion

In this country there is a yearly loss or waste from rust and corrosion amounting to Five Hundred Million Dollars (\$500,000,000), chiefly on account of poorly made iron and steel. Each individual in the community bears a portion of this loss. You may say it does not affect me. I bear no part of that loss. Well, let us see. You may not have had a fire for the past ten or fifteen years, perhaps you never had a fire, yet you must admit that on account of the loss due to fires that others have had, most of which are preventable, your insurance cost is increased.

War is one of the most wasteful things in the world. You certainly never had any part in causing war; yet you must help bear the loss, for eighty cents out of every dollar of federal taxes which you are assessed, go to pay for the loss and waste from war. We are prodigally

wasteful. It is said that the average French family could subsist on what the ordinary American family throws away.

Someone has said that he who causes two blades of grass to grow where but one grew before, confers a blessing. Then, may we not truly say that those who through long and patient research effort have found a way to add years to the life of sheet iron, are doing a helpful and worthwhile thing?

Nothing Mysterious or Supernatural About Lasting Quality of Old-Time Sheet Iron

We all know that old-time sheet iron lasted for many years. There was nothing supernatural about it. It was made by human beings just like we are. There were three simple reasons for its long life.

In the first place, it was made by skilled artisans, men who knew how to make iron. In the second place, they took their time. They were not working on a production basis. Their object was to produce a good iron, so they refined the metal so long and carefully that all of the impurities—carbon manganese, sulphur, phos and silicon, were reduced to such a low percentage that they would not segregate. These impurities would be evenly distributed throughout the bath of metal.

The third reason was that there was copper in their iron. They did not add it. They were even unaware of its presence. It was introduced through the ore. At that time iron ores were available which were rich in copper content. When an iron ore will assay anywhere from one to five-tenths of one per cent copper, it is considered a rich copper bearing iron ore. Such ores are no longer available. On account of their

slow and careful refining process, the copper in the iron ore would unite with the iron because of the carbon having probably been reduced to about .03 or .04 and a true copper iron alloy would be formed.

If you will secure a piece of any old-time sheet iron, and have it analyzed, you will find that it contains anywhere from one to five-tenths of one per cent copper.

These were the three simple reasons why old-time sheet iron did last so long, and when we undertake to make a durable, rust and corrosion resisting sheet iron today, we must be willing to spend the time and use the care necessary to produce pure iron.

Sheet Iron Roof in Actual Service for 93 Years

Mr. Howatt, Chief Engineer for the Chicago Board of Education, told me, only within the past few days, that they do not get more than five years of service from tin roofs. The roof on the United States Mint Building in New Orleans, which is of 20-gauge sheet iron, has been in service for the past ninety-three years. It has been painted only on an average of once every fifteen years, to be exact only 3 times in the last 49 years, and is still in good condition.

Sheet Iron and Sheet Steel

The term sheet iron is very carelessly used by most persons. In fact, few seem to know that there is any difference between sheet iron and sheet steel. Of course you practical sheet metal workers know there is a marked difference between the two. Let me very briefly tell you how differently the two products are made.

How Sheet Steel Is Produced

Ordinary sheet steel is poured from the open hearth furnace at a

*Address by George Steck, Central Alloy Steel Corporation, Massillon, Ohio, delivered before the members of the Sheet Metal and Heating Contractors' Association of Indiana, Inc., in convention at the Hotel Denison, Indianapolis, Indiana, January 24 to 26, 1928.

temperature of about 2500 degrees, and at that temperature the impurities, carbon manganese, sulphur, phos, and silicon amounts to about .70, which is a considerable quantity, and will segregate in different parts of the sheet. Where this segregation occurs, corrosion, or as Dr. Cushman in his bulletin No. 35, which is issued by the Department of Agriculture at Washington, terms it, auto electrolysis, will follow. Dr. Cushman says that where either carbon manganese, sulphur, phos or silicon, or all of these things segregate there is a difference in chemical composition. Where there is a difference in chemical composition, there is a difference in electro-potential or electrical conductivity, and where that condition arises an electrolytic action is set up as soon as the sheet becomes moist, which may be on the very day it has been applied. Then the process of disintegration has begun, and just like interest—day and night and Sunday—it continues until the sheet completely fails at that spot, because in a microscopic way the atoms of iron migrate from one pole and are piled up at the other pole, taking it away from one point of least resistance and piling it up at the other until within probably one, two or three years a bunch of little holes is eaten through the metal. The other parts of the sheet may be good and might last for years, but it has failed on account of those holes.

You never have this condition in a well made iron, for instead of tapping well made iron out of the open hearth at 2500°, the process of refining is continued many hours longer, and the temperature is brought up to between 2800 and 2900°. The melting point of the refractory brick lining an open hearth furnace is only 3,000°, so that in making a heat of well made iron, the temperature is brought almost to the point of melting down the very walls of the furnace. But then we have reduced the five major impurities—carbon manganese, sulphur, phos, and silicon, to such a low point that they will be evenly distributed throughout the bath of

metal, and a homogeneous sheet will be produced.

The impurities above mentioned will then have been reduced to at most .25, and a good iron 99.75 pure will have been made. Then if this iron is given the benefit of the chemist's experience and the alloys of copper and molybdenum are added in the right quantity, it will greatly lengthen the life of the iron.

To make good, durable iron, care must be exercised in the selection of the raw material. A low sulphur content coal should be used in order that low sulphur content coke may be produced, for most of the sulphur in iron ore products is introduced through the coke. Then low sulphur content ore should be used.

Several Potential Causes of Corrosion

Molten metal has the property of dissolving more or less of the gases with which it comes in contact, oxygen, nitrogen and hydrogen; and when the metal is poured from the open hearth furnace into the ingot moulds, these gases are present in the heart of the ingot in a dissolved state. We call this occluded gases. They are a potential cause of corrosion. The tendency of these gases is to rise and escape from the top of the metal; but as the ingot cools too rapidly to permit all of these gases to escape, the ordinary sheet metal maker crops about 6 inches from the top of the ingot. This, however, is not enough to eliminate this source of trouble altogether. In well made iron the ingot should be cropped at least 12 inches deep. Then this source of corrosion is eliminated. When the ingot is placed in the soaking pit for re-heating to bring it to a proper rolling temperature, the metal is often burned on account of the ordinary high carbon content. Thus another cause for corrosion is introduced. This can be prevented only through that careful refining process which reduces the carbon content to around .03 or .04. Then the metal will not be burned in the soaking pit.

In the production of any iron ore product, more or less stress and strain is set up. Most of it is the

result of too rapid production at improper temperatures. This is another potential cause of corrosion, to eliminate which the sheets should be carefully annealed. The best practice provides that the sheets should be placed in sealed steel boxes, put into an oven, and brought to a temperature of about 1600 degrees, which should be maintained for 24 hours. Then the sheets should be allowed to cool for another period of 48 hours. The sheets are thus carefully annealed, and if good raw materials have been used, proper refining and other necessary care exercised a soft, ductile, workable sheet iron will be the result. We now have a well made black iron sheet. Before immersion in the galvanizing pot, they should be thoroughly cleansed by proper acid baths, and made free from surface defects. Then the galvanized coating will adhere firmly to the sheet.

It has been found that when copper and molybdenum are added in just the right proportions, to a well made iron, that these elements will unite with the iron and form a true copper molybdenum iron alloy. The addition of these alloys, copper and molybdenum, very greatly lengthens the life of sheet iron. No one nowadays wants to be known as the man who says, "It can't be done." A way has recently been discovered with the aid of the alloys, copper and molybdenum to again produce sheet iron comparable to the old time iron, let no one say it can't be done, for what has been done once can be done again.

When you go to the dentist you do not undertake to tell him what materials he should use in his work—you assume that he fully understands this. When the dentist employs you to put spouting on his house, he probably assumes that you will use good material. Your customers are your friends. You owe it to yourself as well as to them, not only to apply good workmanship, but to sell to them the best materials available. Make yours a quality shop. Use the most durable materials available. Then, like the coal man, you will make warm friends.

Selling VENTILATORS to Poultrymen on Basis of Increased Egg Production

*Ventilation Important Because Respiration
Principal Means of Eliminating Moisture*

By PROFESSOR A. J. MACK*

THIS is the sixth of a series of articles on farm ventilation. This article will deal with poultry house ventilation. Definite conclusions as to the ventilation requirements of poultry houses have not been reached, although much experimental work has been done in recent years and much work is still in progress.

As in all animal shelters, the ventilating system plays an important part in the proper design of the poultry house. It is the function of the ventilating system to supply fresh air, remove odors and excess moisture. In so doing it is a valuable aid in temperature and humidity control. When functioning properly, economy is reflected in the health of the birds and in increased egg production. Fresh air is especially desirable for breeding stock. Results of experiments have plainly shown that the vigor and vitality of chicks from the eggs from hens having plenty of fresh air is much better than from the eggs from hens cooped up.

Since respiration is the principal means of elimination of moisture in poultry, it is highly important that the birds have an abundance of pure fresh air. Some authorities maintain that rather low temperature, dry air is preferable for poultry.

Investigators have determined that a chicken will breathe about 1.2 cubic feet of air per hour. In order that the carbon dioxide (CO_2) content of the air may not exceed the maximum of nine volumes in 10,000, an air circulation of 40 cubic

feet per hour per bird is required with a minimum space of 10 cubic feet per bird in the poultry house.

The measurement of the CO_2 content of the air is the method usually employed to determine the purity of the air. The quantity of CO_2 in the air, however, is secondary to temperature, humidity and air movement. Inactivity of the birds with resultant slump in egg production may be a result of high temperature, high humidity or both. High temperature and high humidity also impair the vitality of

windows are even placed below the level of the drop boards on the north side. This is conducive to sanitation as the sick birds will not tend to take refuge under the drop boards and the hens will not seek out this location for nests.

The need of special ventilating equipment is, of course, dependent upon the construction of the shelter and upon the weather conditions. In the colder climates tightly constructed buildings are necessary. This makes a ventilating system very necessary. In the colder cli-

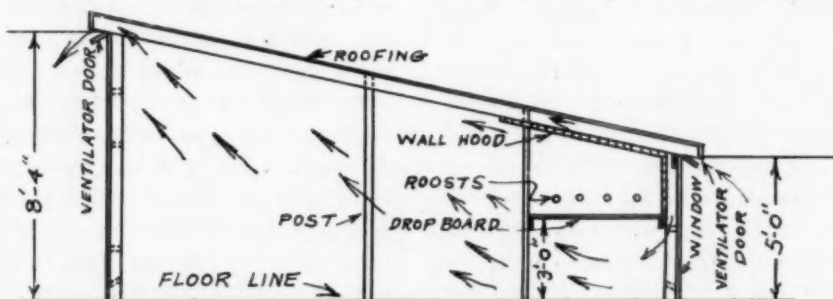


Figure 12 Showing One Plan of Ventilating for Poultry House Without the Use of a Roof Ventilator, But Requiring a Double Wall

the flock, making it more subject to disease.

There is probably less standardization in poultry house design than in any other type of farm building. The type best suited for the purpose is, of course, dependent upon general weather conditions. In the design of the poultry house, sanitation, dryness, freedom from drafts, warmth, ventilation, light and economic construction should be considered. The low shed type of house, 20 feet in width, seems to be the one given preference when all things are considered. As sunlight is a very good sterilizer of disease germs, it is desirable to have sufficient windows in the house. The windows also give a longer daylight period during which the birds are active. In some cases

mates the temperature must be warmer in the winter and cooler in the summer than the outside temperatures.

Muslin is extensively used in poultry house ventilating problems in the more temperate sections. The extent of the value of this practice is questioned by some authorities. In some tests of the CO_2 content of the air in cases where muslin was used the effectiveness was not as great as had been anticipated. The use of muslin would be desirable possibly from other angles such as temperature control and the prevention of drafts. When muslin is used it could well be placed in a frame so it could be opened or closed as are the windows.

The later designs of poultry

*This is the sixth of a series of articles on farm ventilation written exclusively for American Artisan by Professor A. J. Mack, Department of Mechanical Engineering, Kansas State Agricultural College, Manhattan, Kansas.

houses have special arrangements for ventilation with or without the use of muslin incorporated. Figure 12 shows a plan of ventilation for poultry houses wherein the principles of ventilation are carried out without the use of roof ventilators. The portion of the house back of and over the roosts is double and the air passes downward between the studding and passes out at openings at the top in front. Drafts on the fowls are thus eliminated. The openings at both the front and the back may be controlled by means of flap doors running the length of the building. They are so arranged that a minimum opening necessary for ventilation is always assured as the doors will not close entirely.

Figure 13 shows a plan submitted by the Swartwout Company with permission to use it in these articles. This design has been successfully used in Illinois, Indiana, Michigan and New Jersey poultry raising sections. In this plan the

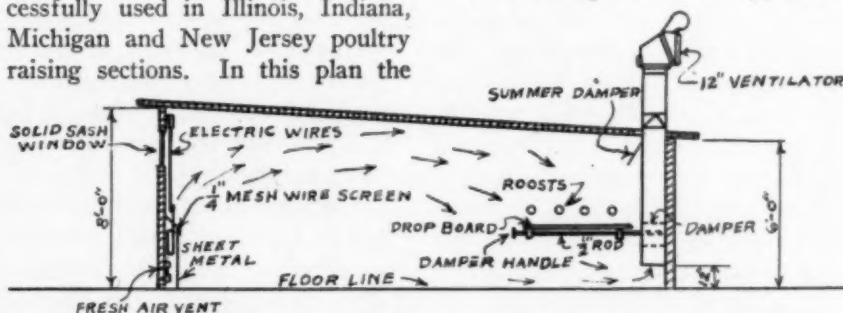


Figure 13 Showing a Plan of Ventilating a Poultry House by Use of an Automatic Roof Ventilator. The Method Used Is Very Similar to That Used for Dairy Barns

automatic roof ventilator is made use of to advantage. The better principles of ventilation have been carried out and provision has been made for artificial heat when necessary. In a building 20 feet by 20 feet, two fresh air vents six inches square and ten feet apart are provided near the floor and each air inlet is provided with a 500 watt space heater. This plan of heating can, of course, only be used where electricity is available. The warm air furnace has been used to advantage.

A box-like galvanized iron shield directs the incoming air upwards through a wire mesh screen placed over the open end of the shield.

A twelve-inch automatic roof ventilator with outtake about twelve inches from the floor serves for the

air exit. The outtake is provided with dampers for control as shown.

This plan is almost identical with the King system used in dairy barn ventilation and should be very satisfactory if it is correctly proportioned for the individual house and for the existing conditions in the locality.

This concludes the article on poultry house ventilation. The next article will deal with hog house ventilation with additional side lights on farm ventilation problems.

World Zinc Conditions as of January 1st—Ashcroft Process Described

Perhaps the less said about the disappointments of the past year the better. Misfortunes were not confined to the members of the zinc industry in America; producers in Europe and ore suppliers in

world stocks of the metal fairly modest. But somehow or other confidence has been entirely lacking in the zinc market and the price slumped in sympathy with lead, of which there was a super-abundance, indicating over-production.

True, there was and still is a disposition to slightly over-produce zinc, too, and the portents are that in 1928 another output record will be achieved. Still, with industrial affairs progressing satisfactorily in the Old World and the promise of no retrograde movement in trade in the United States, consumption this year should also break record. For reasons that need not be traversed here, we expect a distinct advance in the selling price of lead by the summer, and it can be taken for granted that a betterment in that direction will be accompanied by such a gain in the selling price of slab zinc as will gladden the hearts of producers everywhere.

One of the features of the year was the rapidity with which high-grade zinc leapt into popularity in Europe. Consumers, especially in Central Europe, who could not be persuaded to try 99.9 per cent purity metal before 1927, are now willing buyers at premiums ranging up to £3 a ton. The insistent demand for high-grade has indeed been responsible for periodic famines in the available supply and the new year promises well for the producers of this specification in the United States, Canada, Australia and Europe.

We estimate world stocks of slab zinc as of January 1st, 1928, as follows:

	Metric Tons
United States	37,000
Canada	2,400
Australia (including afloat)	2,800
Germany-Poland	6,100
Belgium	4,200
Great Britain	1,100
Scandinavia	200
Far East	600
Elsewhere	1,700
Total	56,100

In deference to the wish of friends in the United States that we should say a few words about new processes under trial, we propose to give a brief description of the Ashcroft process known as "New metallurgy."

Africa and elsewhere had their fair share of troubles also.

The closing quotation for G. O. B. spelter, or in other words, prime Western zinc, on the London Metal Exchange on December 30th was £26 5s per long ton, which contrasts with £32 15s on January 1st, 1927.

Complete figures are not available at time of dictation of these notes so that our preliminary estimate of 1,320,900 metric tons as world production for last year may need slight revision later. Now, having regard to the fact that such a production is a world record, it is almost unbelievable to those not in the trade to learn that the zinc industry did not enjoy a year of prosperity, especially as consumption was likewise a record and

Selling It Is the Job Today; Producing and Financing Only Secondary

Sheet Metal Man, Like Alice in Wonderland, Must Run Twice as Fast to Get Ahead

By STANLEY A. KNISELY*

WHERE, in this day of "profitless prosperity" and "red-ink expansion" is the cream of profits?

O. H. Chaney, Vice President of the American Exchange-Irving Trust Company, tells the story about the milk man and Mrs. Newlywed. At the mild complaint of her husband, she asked the milk man why there was never any cream on the milk. The next morning she reported to her husband as follows:

"I really shouldn't have asked him, but he was awfully nice about it. He is really too honest. He told me that he fills the bottles so full of milk that there's simply no room for the cream."

Mr. Chaney goes on to say that at the present time our prosperity bottle is so full of business that there seems to be no room for profits.

Three Requisites to Success

How to get more cream, and incidentally, more milk in the sheet metal contracting business is what concerns us.

To know one's business, to believe thoroughly in it and to be able to make others believe in it, are three requisites to success, no matter what the business.

Let us start with the requisite that every man must know his business. In a one-man concern, thorough knowledge of the business must dwell in the intellect of one individual. The single individual running a sheet metal contracting business must be more thoroughly informed than the president of a

large corporation. The sheet metal contractor must know production, financing, management and merchandising; he must understand the details as well as the broad fundamentals, whereas, the president of a large corporation can employ specialists in these various branches to help carry the load.

The point I want to make is, that you can drift into the presidency of a large corporation with a mind thoroughly equipped to handle either production problems or financing problems or merchandising problems, and succeed in the job by employing lieutenants who are specialists in those branches of business with which you are not so thoroughly familiar, but you cannot drift into the proprietorship of a sheet metal contracting business and expect to succeed with any such lop-sided knowledge.

Sincerity Selling at a Premium

The sheet metal contractor must know ALL about his business and cannot be satisfied with a knowledge of only one or two branches of it. He must know his product, which means he must have a thorough knowledge of the raw materials he handles, the fabrication of those materials and his production costs. This would seem to be quite enough for one individual, but no sheet metal contractor dare be satisfied with this. He must know his market, must thoroughly understand the merchandising of his products and be able to tell you his sales costs. He must understand the financing of his business and its management from beginning to end. This knowledge must be in the business.

Our second major thought has to do with the statement that "a man must believe sincerely in his bus-

iness"; in short, must be thoroughly sold on it. The expression on the faces of a few of you indicate that you are somewhat surprised that such a question should come up. It is possible that you may doubt a man could engage in any business on which he was not thoroughly sold. Let your doubts be dispelled. Many a business man today carries in the inner-most recesses of his heart, a secret doubt concerning the business in which he is engaged.

When I say a man must be sold on his business, I mean that he must be sold on it during periods of adversity as well as during periods of prosperity. No faith or confidence is needed when all bills are paid and the bank balance is mounting rapidly.

I have heard of sheet metal contractors who think that everything is going to pot. As civilization progresses there are isolated instances of some businesses passing out of the picture or becoming so insignificant in the scheme of things as to make them decidedly uninteresting. That, however, does not happen to be true of the sheet metal business, and wherever you find a sheet metal contractor who says that the sheet metal business is going to the dogs, you probably will find that it is the man himself and not the business that is at fault.

Opportunity in the sheet metal business was never so great as it is right now. Continued growth is a certainty. Name me a business with as small an amount of capital invested in it as the sheet metal contracting business that has behind it a similar amount and character of support.

Agencies Aiding Contractor Generally

These are some of the institutions today that are interested in

*Excerpts of an address by Stanley A. Knisely, Director Advertising and Publicity, Sheet Steel Trade Extension Committee, delivered at the convention of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, Inc., January 24 to 26, 1928.

helping you to get more business: The Sheet Steel Trade Extension Committee, the Copper and Brass Research Association, the National Warm Air Heating and Ventilating Association, the American Zinc Institute, Oil Heating Institute, Western Warm Air Furnace Supply Association, in addition to the National Association of Sheet Metal Contractors and your various state associations.

Name me a business with a similar capital investment that can boast of seven trade papers interested in its welfare.

Merchandising the Big Problem Today

Certainly it is not necessary to point out the value of your own national and state associations. *In this day of what has been so aptly labeled "The New Competition," businesses cannot survive without organization.* It is no longer one steel company against another, one sheet metal contractor against another, but it is steel against wood and other materials; the sheet metal contractors against other organized craftsmen. This movement toward coöperative effort has grown so rapidly in the last ten years that it is hard to find today, a business man who does not indorse it. Rare indeed, and rapidly being killed off, is the business man who feels that he can still stand alone and fight competitive battles single-handed. Be thankful that you are as well organized as you are.

So, I say, there is every reason for the sheet metal contractor to be thoroughly sold on his business. People are being made to want more things every day that the sheet metal contractor can supply. Also—and this is important—it is becoming easier all the time to sell people quality. All of us are being educated today through the newspapers, magazines, the radio and other channels that it is best to give consideration to quality as well as to price. So far as the sheet steel is concerned, that means, selling a product of adequate gauge, adequate protective coating and of good workmanship.

The third requisite, namely, that

a man must not only know his business and be thoroughly sold on his business, but "must be able to sell others on it," is in my mind second to none in importance. Today, selling it is the job. No matter what line of business one considers, it is quickly discerned that the big problems, the ones that are causing the grey hairs, and filling our sanitariums with nervous wrecks, are not problems of production or of financing, but those pertaining to merchandising.

Selling is only telling.

Really there are comparatively few people who know what you sheet metal contractors are able to do for them, and those who ever think of you are still fewer. You must tell the people about your business. In the fifteen years that I have been a prospect, no sheet metal contractor has ever approached me. I have struggled along with leaky gutters and down-spouts; I have put up with furnace smoke pipes that were so full of holes they needed no damper. Other businesses were after the few dollars I had to spend. They were telling me how necessary it was that I have an automobile; what it meant to my family to be able to go out into the country and the fresh air; they were telling me how necessary it was to own a radio; how the talking machine would bring the greatest musical artists into my home at a ridiculously small cost. They were TELLING me about their business.

Customer List an Absolute Essential

On the other hand, no sheet metal contractor ever told me how much money I was losing in poor combustion of coal. I never got a letter or post card from a sheet metal contractor suggesting that I have my gutters, down-spouts and flashing repaired before the heavy fall rains came along. I hardly knew there was such a man as the sheet metal contractor until I got into the steel business.

The sheet metal contractor who does not have a customer list and prospect list in his office is not equipped with the necessary tools

to compete with other business men who are fighting for a share of the consumer's dollar. If you must do without some tools, throw away your snips and build up a mailing list.

The sheet metal contractor who is satisfied with the business that strays into the office or who expends all of his energies chasing the big contract that hangs at the end of the rainbow, meanwhile overlooking the opportunities for more profitable business in his own back yard, is not selling his business.

Let me tell you the true story of Bill Simms. Bill was a village tinner thirty years ago. He opened up a general store in the community in which he lived. The farmer was the man upon whom Bill depended for business, because the community itself was small. In 1925, Bill sold seven cars of roll roofing. In 1926, he sold twelve cars, and in 1927, he sold twenty-four cars.

Bill has been a merchant for nearly thirty years. He became a merchant only a few years ago.

For most of his thirty years in the sheet metal business, Bill was satisfied with the little work that he could pick up in and around the small town where he lived. One day, however, he was inspired with the idea that he could *create business*. It was then that Bill Simms ceased to be a mechanic only, but became a business man in the larger sense of the term.

Bill sells galvanized steel roofing to farmers at \$7.50 a square on the roof. At present he has four gangs of two men each, who apply the roofing. Each gang gets \$1.50 per square for all roofing laid. In order to insure good workmanship, each gang has to repair any faulty job, at its own expense. Bill pays about \$5.00 a square for the material and has a profit of about \$1.00 a square. Because of his system of wages, Bill's workmen are busy in the summer from sun-up to sunset. They furnish their own transportation, gasoline, tires and tools. Bill delivers the material to the job. If a buyer so desires, he can save a little by hauling his own material.

Employing the Satisfied Customer

Here's where Bill's merchandising sense comes into play. He follows the practice of using the satisfied customer to sell his wares—not only roofing, but particularly furnaces. When he sells a roof to farmer Brown and collects the money, he says, "Now, Brown, you and I are even. I have given you a good roof and you have paid me for it." Then he turns to Mrs. Brown. He knows that Mrs. Brown attends the church socials, the Ladies' Aid Society and various other functions. He knows that women talk. He tells Mrs. Brown that if she likes the new roof on the barn and if she tells some friend about it and tells that friend that Bill Simms put that roof on and what a fine job it is, and how quick he did the work, and how he cleaned up everything around the barn after it was done, and if she thereby succeeds in getting a new customer for Bill, she can expect to receive a nice double steamer roaster, or some other worth-while token of appreciation. This also is the way Bill sells furnaces. This is the way Bill has boosted his roofing business from seven cars to twenty-four cars in three years. I wonder if any of you gentlemen are overlooking the farm market.

The best business you can get is that business which you go out and create. When you figure on the big contract jobs, you are in competition with every other sheet metal contractor who wants to bid on it. Prices are driven down until often times you find yourself a victim of "profitless prosperity." Too much milk and no cream. On the other hand, when you go out and create business you are better able to keep it outside of, and above competition. There is the cream, the result of real selling.

A man who has been connected with the sheet metal contracting business for years and who is perhaps, one of the best posted men in the industry, wrote me recently as follows:

"It is my conviction that if the

average sheet metal contractor can be awakened to a realization of the opportunities he has for developing a continuously growing business by the simple process of taking up new and kindred lines of work, he can make a lot more money. To do this, he will have to develop some vision and make of himself a merchant as well as an artisan. He will have to learn to sell things as well as to construct and install them. The average sheet metal contractor thinks about his business as being confined to those things in which the use of sheet metal is pretty well standardized, such as the laying of roofing, the construction of eaves troughs, gutters, down-spouts, ventilating ducts, skylights, furnaces, etc. As a matter of fact he is the best qualified artisan for the handling of business in which sheet metal is involved in any way. If he will avail himself of his opportunities to promote and sell these things in his community he can become merchant as well as artisan, and greatly increase both the volume and the profits of his business."

Coöperative Newspaper Advertising for Sheet Metal Men

One of the best things sheet metal contractors could do to promote the business in which they are engaged would be to join hands in coöperative newspaper advertising. In any community where there are three or more sheet metal contractors, it would be good business to engage in a joint newspaper advertising campaign for the sole purpose of letting the public know something about the sheet metal contracting business. Such advertisements could carry the individual names of the contractors paying for the advertising. The cost would be small. The aim would be, first, to sell the idea of a warm air furnace or a metal roof or a metal cornice. After that it would be time enough for each to sell his own company without tearing down the business.

Another illustration of the lack of interest in the general welfare of the business they represent is to be

found in the difficulties experienced by the Sheet Steel Trade Extension Committee when it seeks to enlist the assistance of some sheet metal contractors in getting favorable consideration for sheet metal in building codes. Sheet metal contractors in any community are in an excellent position to assist in this work of revising building codes. Not infrequently we find when we seek assistance of this kind, that one contractor does not care much about what the building code specifies with regard to metal, because he is interested in only a little marquee work. Another may be interested principally in cornices, and so long as the building code permits metal cornices he is satisfied.

Merchandising enamelled steel wall tile is the legitimate business of every sheet metal contractor. The market is almost beyond comprehension. New construction is the smallest part of it. Every home in your community is a prospect. No woman lives who would not like to have an enameled steel tile wall in her kitchen, bathroom or laundry, especially when it can be obtained in a number of beautiful colors. It can be easily and quickly applied over the old plaster walls and at a price ranging from two-thirds to one-half the cost of the vitrified clay tile.

What is true of these wall tile from the standpoint of the sheet metal contractor's opportunities, is in a measure true also the sale and installation of clothes dryers, radiator covers, porcelain enamel laundry tubs and many other commodities on which he can very rapidly develop business.

Selling it is the job, and we have to move fast to beat the other fellow to it. Everybody who has anything to sell is racing after the consumer's dollar today. The man who runs fastest, physically and mentally, gets the biggest share of it.

I wonder if Lewis Carroll was looking ahead rather than backward when he wrote that delightful little story, entitled "Through the Looking Glass." All of you remember

Alice's experience with the Red Queen. Here is how Carroll describes it.

"The Red Queen suddenly grabbed Alice by the hand and started to run.

"Faster, faster,' but Alice felt she could not go faster, though she had no breath left to say so. The most curious part of the thing was that the trees and other things around them never changed their places at all. However fast they ran, they never seemed to pass anything.

"I wonder if all the things move along with us,' thought poor puzzled Alice, and the Queen seemed to guess her thoughts, for she cried:

"Faster; don't try to talk.'

"Finally, after an interminable and breath-exhausting period of running, they stopped and Alice sat down against a tree. She looked around her in great surprise.

"Why, I do believe we have been under this tree the whole time; everything is just as it was.'

"Of course it is,' said the Queen. 'Here you see it takes all the running you can do to keep in the same place. If you want to get ahead, you must run at least twice as fast.'

"Thereupon, Alice proved that she was not a modern business man when she replied:

"I would rather not try, please; I am quite content to stay here.'"

Friday the 13th a Lucky Day for Harry Jones and Walter Class

Harry R. Jones, 308 Kenmore road, who represents Milcor in Indiana, and a Nickel Plate train both sought to make the same crossing near Alexandria, Indiana, Friday the 13th, at the same time. Jones decided that the train was a little too much for his Chevrolet and turned into the ditch. Both the car and Jones were somewhat battered, but neither suffered serious damages.

Mr. Jones, accompanied by Walter Class, 1710 East Tenth street, Indianapolis, was approaching the railroad and when within a

few feet of the crossing a train came sweeping through a cut from the East, which had previously been invisible to the autoists, Jones turned his car into the ditch and narrowly escaped serious injury, if not death.

Mr. Class was uninjured save for slight bruises, while Jones suffered chest injuries and a badly sprained back. He is rapidly recovering and expects to be on the streets before the end of the week.

Mr. Class drove the car home with Jones as a passenger, both being thoroughly convinced that Friday the 13th was a lucky day for them.

Harry Jones, in addition to his work representing Milcor, is prominent in Boy Scout work, being Scout Master of one of the Irvington Methodist troops, and is active in local Republican circles.

Harry Jones says he saved Walter's life, but Mr. Class says he saved himself.

John A. Anderson, Galesburg, Illinois, Dies After Long Illness

The many friends of John A. Anderson, Anderson Furnace and Repair Company, Galesburg, Illinois, will be sorry to learn of his death, which occurred January 18, 1928, after a prolonged illness. Mr. Anderson had been in the sheet metal and hardware business for the past fifty-three years. He is survived by one sister.

Reduction in Prices Announced by Standard Ventilator

The Standard Ventilator Company, Lewisburg, Pennsylvania, makers of the Standard rotatable ventilator, have recently announced a price reduction on their products.

Refinements in the manufacture of their products has made this reduction possible, although the quality of the product is in no way reduced, say officials of the company. Full information regarding the refinements that have been made can be had by writing the company at their home office in Lewisburg, Pennsylvania.

Seelbach of Forest City- Walworth on American Plan Association Board

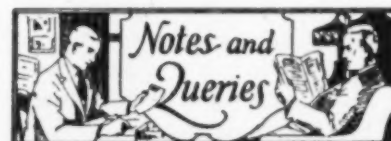
W. L. Seelbach, secretary and treasurer of the Forest City-Walworth Run Foundries Company, has been elected as one of the board of governors of the Cleveland branch of the American Plan Association. Six other men, all prominent in industrial, are also on the board.

Finds Articles by A. J. Mack Interesting and Helpful

TO AMERICAN ARTISAN:

Your articles by A. J. Mack, of the Kansas State Agricultural College, Manhattan, Kansas, are certainly interesting. While we sheet metal people are not all farmers, we are interested in helping, because when the farmer is going well, the whole country is prosperous.

GEORGE CROUCH & SONS.
Chattanooga, Tennessee.



Metal Tile

From Calumet Sheet Metal Works, 915 Calumet Street, Hammond, Indiana.

Kindly advise us who manufactures sheet metal tile for bathrooms.

Ans.—Porcelain Tile Company, Builders Building, LaSalle and Wacker Drive, Chicago, Illinois.

Sheet Zinc

From Rubin Metal Weatherstrip and Screen Company, 127 Sumner avenue, Schenectady, New York.

Please advise us where we may obtain sheet zinc.

Answer—Merchant and Evans Company, Philadelphia, Pennsylvania, and the New Jersey Zinc Company, 160 Front street, New York City.

Repairs of Doylair Stove

From M. O. Miller, Jr., Durand, Illinois.

Please advise me where I can obtain repair parts for a Doylair, number 214 stove.

Ans.—South Beloit Fuel & Manufacturing Company, Beloit, Wisconsin.

Random Notes and Sketches

By Sidney Arnold

"The essence of humor is sensibility; warm, tender fellow-feeling with all forms of existence."—Carlyle.

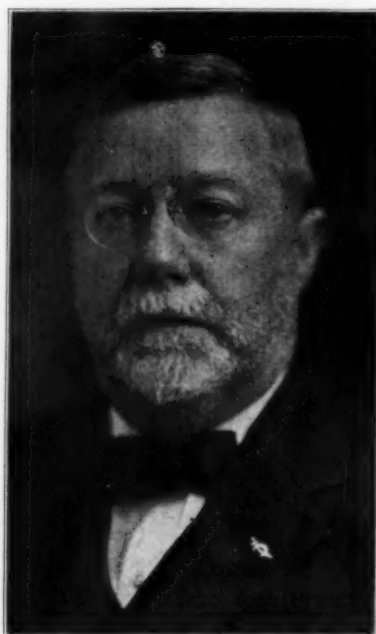
Foremost among the many things I enjoy about my job is the opportunity it affords me of unearthing the real characters of the men in the sheet metal business. It is truly surprising what a little prodding around will uncover in the way of the most admirable of characters, whose modesty is so great as completely to conceal hearts of gold and the most tender feeling. For instance, it required four trips to Indianapolis for me to learn the full magnanimity of spirit of Joseph Gardner, senior member of the present firm of the Joseph Gardner Company, sheet metal contractors, roofers, and engineers, Indianapolis. Because of his extreme modesty, few people ever get to know of the vast number of activities Mr. Gardner has engaged himself in, in addition to making a success of the sheet metal business established by his father, the late Joseph Gardner.

He is a true Hoosier, having been born in Indianapolis in 1866; his entire life has been spent in the city, where in his youth he attended the grade and high schools. Mr. Gardner entered the sheet metal contracting business of his father, which for 45 years was conducted at 37-43 Kentucky Avenue, Indianapolis, and which just recently moved to 147-153 Kentucky Avenue to accommodate the vastly increased business.

Mr. Gardner is very closely associated with the sheet metal activities, taking an active part in all its undertakings. He is a member of the Board of Directors of both the Sheet Metal and Warm Air Heating Contractors' Association of Indiana and the National Association of Sheet Metal Contractors of the United States at the present time, having served these two associations as President in recent years.

In addition to his keen interest in the welfare of the sheet metal

industry, Mr. Gardner is also interested in many of the local civic and charitable organizations. He is at present a member of the Board of Governors of the Indianapolis Board of Trade, and has served on this board since December 5, 1910, during which time he held the offices of both Vice President and President, the latter in 1918-19.



Joseph Gardner

On the wall of the Indianapolis Board of Trade library there hangs a large picture of Past Presidents of that organization, and Mr. Gardner's occupies a prominent position here.

In charitable work, Mr. Gardner also figures prominently. His activities in this direction have won for him the honor of serving as President of the Altemheim Old Folks' Home and a member of the Board of Directors of the General Protestant Orphan Home. Of this latter organization he has also served as President and Vice President. He has also served at one time as Financial Secretary of the Old Protestant Deaconess Hospital, now known as the Indiana Christian Hospital.

During the recent World War, Mr. Gardner took an active part in the drive for the sale of Liberty loans, the war chest and various other war activities.

Among the various other local organizations, Mr. Gardner is an active member of the Indianapolis Chamber of Commerce, Kiwanis Club, Atheneum, Credit Men's Association, Indianapolis Athletic Club, Hoosier Athletic Club, and Indianapolis Lodge No. 13 of the Benevolent and Protective Order of Elks, including membership in Masonic lodges, Ancient Landmark Lodge No. 319, F. and A. Mason; Keystone Chapter No. 6, Royal Arch Masons; Indianapolis Council No. 2, Royal and Select Masons; Roper Commandery No. 1, Knights Templar; A. A. Scottish Rite and Murat Temple of Mystic Shriners.

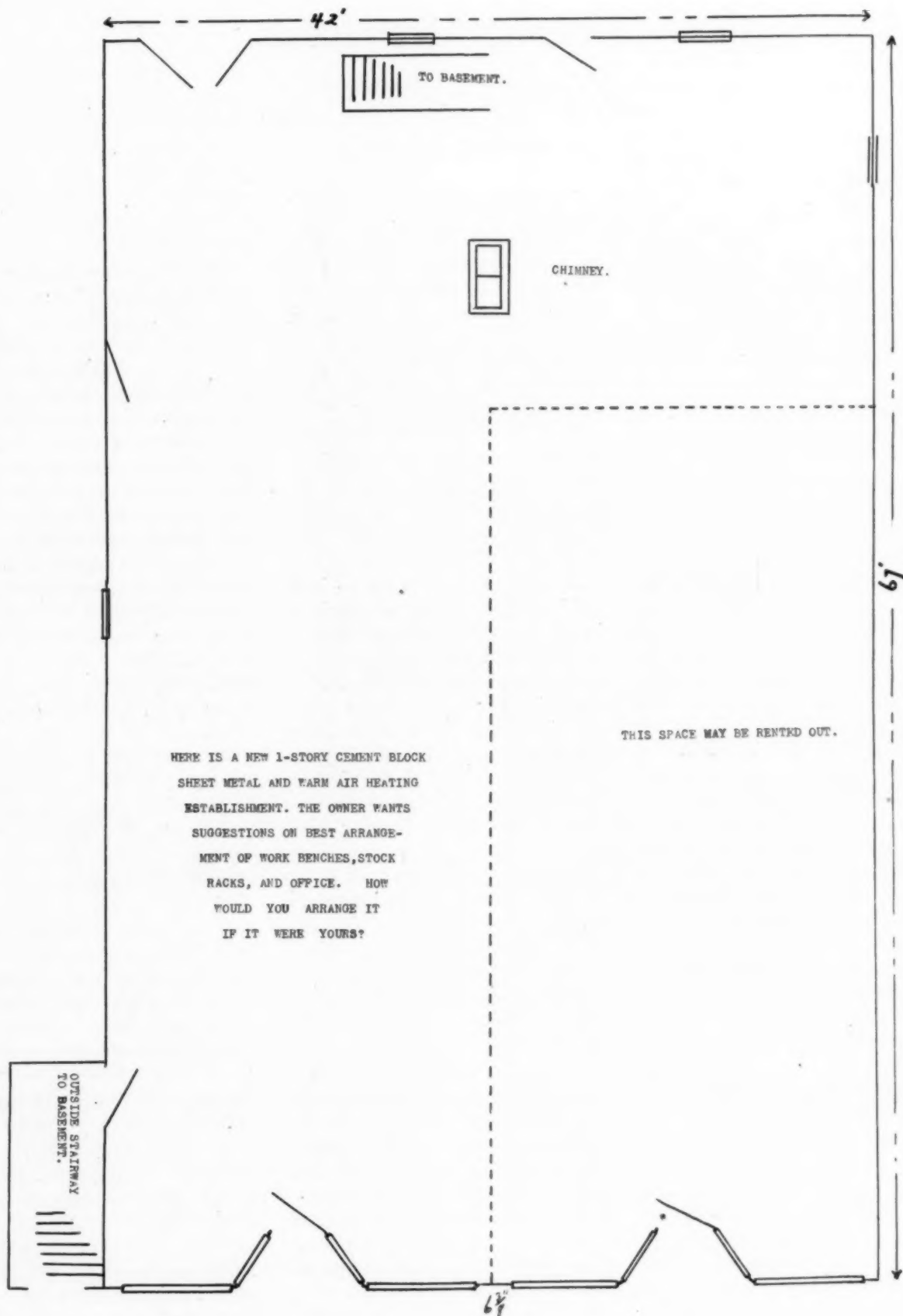
Here is a case of extreme modesty covering a truly noble heart. It is one of the characteristics of the Gardners, because Mr. Gardner has a son, Ed. A., who has it to a fault.

* * *

I had a very enjoyable visit from Al. J. Svec, La Crosse, Wisconsin, on Monday of this week. Mr. Svec does general sheet metal work and installs furnaces, and is a very interesting conversationalist. He has had lots of experiences in the sheet metal business which are unusual to say the least, including some of the tricks that other sheet metal men have played upon him to get business. I enjoyed Mr. Svec's visit very much indeed, and I hope he will not fail to drop in again the next time he is in Chicago.

* * *

My friend Paul Flathou of Crown Point, Indiana, stopped in to see me one day this week. Paul is one of those busy warm air heating contractors who gets the jump on the other fellows by getting his plans in such fine shape his customers know just what he is talking about and what his installation will do. He had a roll of such plans under his arm when he came in to see me and he was looking for more information about fan blast work.



Greater Chicago Warm Air Heating Association Rapidly Gaining Membership

Difficulties of Application of New Code Being Ironed Out

By GEORGE J. DUERR

THE regular meeting of the Greater Chicago Warm Air Heating Association was held in the Hotel Sherman, January 30, 1928. A very large attendance of members and non-members was present, with L. M. Burt presiding.

At the outset of the meeting President Burt read the passage of the by-laws pertaining to the purposes of the organization, bringing out the fact that this body of men is an association of betterment for the entire warm air heating industry in the city of Chicago and surrounding suburbs.

Applications for membership were passed to those men indicating their desire to become a member of the association. Seven firms were voted into full fledged membership at that meeting. They are as follows:

New Members Voted in

Hess Warming & Ventilating Company, 1207 South Western avenue.

S. & W. Sheet Metal Works, 4175 Elston avenue.

Mont Clare Furnace Company, 23 West Harrison street, La Grange.

Norwood Park Cornice Works, 5901 Slocum street.

Anderson Furnace Company, 4609 Elston avenue.

William Bos Sheet Metal Works, 6840 South Racine avenue.

Vasco Heating Company, 1844 West Madison street.

The committee on standardizing fittings reported that a set of patterns for standard fittings had been drawn up by William F. Wahler, specimens of which were on display at the meeting. These fittings met with the requirements of the Standard Code in every way, and it was voted that the association should sell the sets to the members

of the organization at \$10 per set. They are made of 26-gauge metal.

The cost of making these fittings up in dozen lots per item was figured as follows: the cold air shoe, \$1.80; the joist transition collar, \$1.20; the offset boot, 60 cents.

The pattern on the cold air shoe runs from 14-inch to 24-inch. On warm air the pattern takes in 9, 10 and 12-inch, while the transition extends from 14-inch to 24-inch. There are four styles of warm air boots. These patterns are available to members of the association only at the price of \$10 per set.

In order to facilitate the work of making application for a permit to install furnaces, President Burt is working out a form which will give the building inspector's office the information he needs to know about each job that is installed and which will in turn be used by the inspectors on their work. This form, when completed, will obviate the necessity of having the installer turn into the building department a plan of each job that he works on. These forms as soon as they are complete and approved by the association will be set up and sold to the members of the association at whatever it costs to produce them. As soon as the form is completed it will appear in *AMERICAN ARTISAN*.

It was also stated at the meeting that those men who were finding any difficulty in falling in line on the new program brought about by the passage of the ordinance can get their troubles ironed out by phoning Secretary Fred Goodall, of the G. & S. Stove & Furnace Company, 4224 West North avenue, or the Department of Buildings, City Hall. Building Commissioner Christian P. Paschen is head of the department. The telephone number is Main 1447—local 80. When

telephoning, either Mr. Brennan or his assistant, Mr. Sibert, should be asked for.

The Inspectors Are

The inspectors who have already been appointed are as follows: Charles West, 1531 Austin boulevard, phone, Merrimac 6620; John Rooney, 1532 West Jackson boulevard, phone, Seeley 2426; Charles Carpenter, 2624 North Albany avenue, phone, Belmont 7843; Jake Hare, 3515 Flournoy street, phone, Van Buren 4280; Daniel Rooney, 5306 West Van Buren street, phone, Columbus 7223; William Cantwell, 4852 Crystal street, phone, Columbus 1552; Mark F. Hurley, 742 North Lawndale avenue, phone, Kedzie 7527; Peter A. Murphy, 4656 Ellis avenue, phone, Drexel 8640; John J. Callaghan, 3244 Flournoy street, phone, Kedzie 6482. The tenth inspector has not yet been decided upon at the time of the meeting last Monday night.

Following the detailed routine business, considerable discussion arose concerning some of the points of the new ordinance. Some of the men seemed to be having difficulty in interpreting many of the passages in the ordinance and for this reason the work of adjusting themselves appeared to them to be a great deal harder than it really is. Here came a concrete example of the power of an association to iron out difficulties.

One man had been puzzling over the time the inspection is to be made. He was immediately told that the job must have its first inspection before the lath and plaster is put on the walls. The cold airs must be lined with metal and inspected before they are closed. That would be the first inspection. The job is inspected again when completed.

Another man wanted to know if old house jobs would require two inspections, and he was informed that only one inspection would be made on old house jobs.

A third man said that he was in the habit of furnishing temporary heat for the carpenters so that they might work without danger of their plaster and paint freezing during cold weather and he wanted to know how he was going to be able to continue to do this under the new ordinance. He was assured that the building department would cooperate with him in making arrangements in such cases where necessity required.

It was further stated that all warm air furnace installers will have 90 days to dispose of stock on hand, but they must not make up any new stock that does not conform to the Code; further, where old stock is used it must be of such a nature that the capacity required by the Code is there.

The next meeting of the association will be held at the Sherman hotel, Monday evening, February 13. The time is growing short when members will be allowed to come into the organization under the \$25 initiation fee. After the 1st of March the initiation fee will be raised to \$100. Therefore, it behooves all warm air furnace installers who are desirous of entering the organization to act at once. Information can be had from Fred Goodall, 4224 West North avenue, Chicago, in regard to membership application. The membership has already grown to more than three dozen, and is mounting rapidly.

Present at the Meeting Were the Following:

Adler, A., Adler Sheet Metal Works, 2928 Armitage avenue, Chicago.

Anderson, August, Anderson Furnace Company, 4609 Elston avenue.

Bojan Furnace and Sheet Metal Shop, 5911 Lawrence avenue.

Briggs, Phil., American Radiator Company.

Braunston, M., Liberty Foundry Company, 12207 Yale avenue.

Black, James A., James A. Black Hardware Company, 3200 East 92nd street.

Becker, R. J., Rohn Furnace Company.

Boysen, Robert F., Boysen's Heating and Sheet Metal Works, 3827 North Kedzie avenue.

Becker, Edward C., 4017 North Cicero avenue.

Bos, W., 6840 Racine avenue.

Burt, L. M., Quaker Manufacturing Company, 915 E. 45th street.

Cripe, Samuel, Jefferson Hardware Store, 5213 Lawrence avenue.

Cotteleer, Frank F., Bell Sheet Metal Works, Talcott avenue, Norwood Park.

Duerr, George J., AMERICAN ARTISAN, 620 South Michigan avenue.

Devine, J. E., 260 North Homan street, Hammond, Ind.

Doroyznski, O., Norwood Park Cornice Works, 5901 Slocum street.

Foedisch, Ray J., American Radiator Company.

Goodall, Fred, G. & S. Stove & Furnace Company, 4224 West North avenue.

Grosser, Edward A., Bell Sheet Metal Works, 4871 Milwaukee avenue.

Gottschalk, Fred S., Premier Warm Air Heating Company, 1000 W. Center street, Park Ridge.

Harris, R. C., 260 North Homan street, Hammond, Indiana.

Harris, A. R., 260 North Homan street, Hammond, Indiana.

Hands, Fred C., Hess Warming & Ventilating Company 228 North La Salle street.

Jemison, H. A., Jemison Furnace Company, 3435 North Cicero avenue.

Jemison, R. G., Universal Sheet Metal Works, 4877 Armitage avenue.

Jones, Louis J., Mont Clare Furnace Company, 6307 Grand avenue.

Kirby, William T., Kirby Sheet Metal Works, 3543 West 63rd street.

Lange, Paul B., 235 Harrison street, Oak Park.

Olson, C., A. R. Harris, 13328 Carondelet avenue, South Chicago.

Olson, B. E., Columbia Sheet

Metal Works, 5252 West Division street.

Pihl, Harry S., Englewood Sheet Metal Company, 6120 South Wentworth avenue.

Reif, Mike, John Reif Sheet Metal Company, 2049 Belmont avenue.

Sutton, H., Gilt Edge Furnace Company, 4315 Elston avenue.

Stahler, E. N., G. & S. Stove & Furnace Company, 4224 West North avenue.

Strong, S. E., S. & W. Sheet Metal Works, 4175 Elston avenue.

Valkenaar, E., 4520 Irving Park boulevard.

Wahler, William F., 3717 Elston avenue.

White, P. J., Vasco Heating Company, 1844 West Madison street.

Lennox Circular Explains Features of 1928 Furnace

The Lennox Furnace Company, Marshalltown, Iowa, have recently released a very attractive circular descriptive of their new 1928 Torrid Zone furnace. It is so arranged as to enable warm air furnace installers to use it when selling a furnace prospect on a warm air installation.

Cross-section of the Lennox steel furnace is shown, pointing out at the same time the outstanding features of the new construction. The language employed to do this is such that the technical details have been entirely removed, making it easy to use.

Every warm air furnace installer should make it his business to learn all of the new furnace features that have been released since the first of the year. The circular in question will be sent to you upon request made to the Lennox Furnace Company, Marshalltown, Iowa, or Syracuse, New York.

If you have an exceptional sheet metal or warm air heating window display, why take a photo of it and send it in to AMERICAN ARTISAN for publication. It will give you ideas as well as others. A snapshot will do.

What Is Static Pressure?

By DR. GEORGE DE BOTHEZAT

THE best way to fully understand what static pressure is, is to draw a parallel between the electric generator—which generates electric current—and the fan, which is essentially a generator of air current. When we have to send the electric current furnished by an electric generator into a circuit having a high resistance, the electric generator must be able to develop a voltage high enough to overcome the electric resistance of the electric circuit.

Static pressure is for a fan exactly what voltage is for an electric generator. That is, static pressure (S. P.) is the tension factor for the air current in the same way as voltage is the tension factor for the electric current; the volume of air delivered by the fan per unit of time (C. F. M.) being exactly the equivalent of amperage furnished by the electric generator.

When a fan has to secure the circulation of air through a certain air circuit, it must be able to develop the necessary static pressure to overcome the different resistances in its path. For air currents, these resistances appear in the shape of friction against the walls of air ducts, changes of direction of the air current (bends in ducts), variation of the section available for the air flow, vortices and eddy currents created by different obstacles to the air flow, etc.

To speak about a fan without any reference to its static pressure is thus a physical anomaly. One can form a judgment about a fan (generator of air current) only if both its characteristic factors—the C. F. M. and the S. P. are specified.

By What Physical State Is Static Pressure Expressed in the Phenomena of Operation of a Fan?

When a fan furnishes static pressure, it not only communicates a certain velocity to the air, but it also compresses the air. The den-

sity of the air delivered by a fan furnishing static pressure actually is higher behind the fan—defined in relation to the sense of the air flow—as compared to the density in front of it. In other words, the air, when passing through a fan furnishing static pressure, has its density somewhat increased.

The air delivered by a fan furnishing static pressure continues to move forward after having passed the fan, not only on account of the velocity acquired, but also by expansion. This is the case when the fan is forcing air from the free atmosphere into a certain system. That is why such air currents can well pass through bends, where most of the air velocity is lost, because it continues to move by expansion after passing same. In a case where the fan is exhausting air, the phenomena are reversed. The air is set in motion by the depression created in front of the fan and the air pressure is again brought up to the normal level of the free atmosphere after passing through the fan.

How Is Air Compression Effected by a Fan?

When we have air in a cylinder and compress it by a piston—say, in a bicycle pump—this compression is attained statically, viz., by a direct push on the air by the piston. But a fan compresses the air dynamically, that is, by impact of the blades against the air. The blades in rapid rotation hit the air and not only set it in motion, but also compress it. And if the fan is so built that one blade follows the other quickly enough so that the air compressed dynamically by one blade has not the time to leak backwards in the space between the blades, the air will stay compressed.

One readily can understand that such dynamical air compression is a very subtle phenomenon, and a profound knowledge of laws of air resistance is necessary to accomplish it successfully and with high

efficiency. But one easily can see that it is quite impossible to attain such air compression by a fan not having a sufficient number of blades. In such cases, the intervals between the blades are out of proportion to the blades themselves and most of the air slightly compressed by the motion of each blade leaks backward in the spaces between the blades.

Why should the air stay compressed in front of the large open spaces available for its expansion between the blades? One can rather marvel that even with a large number of blades it is possible to keep the air compressed despite the open intervals between them.

Distinction Between Air Propeller and Fan

An air propeller is in no sense a fan. Exactly speaking, it is something just opposite to a fan. A propeller is designed for the purpose of furnishing a powerful thrust with high efficiency. The ventilation phenomenon connected with the operation of a propeller constitutes a loss. Learned propeller designers call it the slip velocity loss. And certainly, in any kind of apparatus, in order to get a high efficiency, one must reduce the losses.

Thus a highly-efficient propeller must be a low-efficiency fan, otherwise it could not be a high-efficiency propeller. But what is a loss for a propeller constitutes precisely the useful action for a fan. A fan must be so designed to produce a large flow of air, because that is just the factor we want to utilize, with complete disregard to the axial thrust furnished by a fan which, in the case of a fan, is only harmful because of the wearing out of the bearings produced by it.

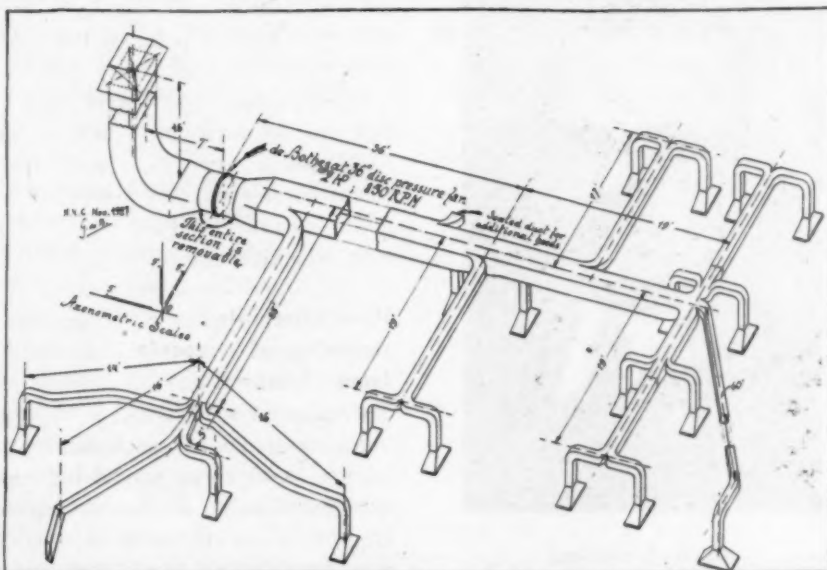
Thus, a good fan must be a bad propeller. The fact that standing in the slip stream produced by an air propeller feels like a very strong air current does not mean anything, because we must compare the

power of the air current to the power of the engine producing it. Aeroplane engines are very powerful engines—200 horsepower, 500 horsepower, etc.—and thus it is not surprising that although propellers are fans of very low efficiency, they still produce powerful air currents, but they produce them very wastefully.

The same slip stream created by a propeller could be produced by a high-efficiency fan with much less power, but such a fan would be a poor propeller for the propulsion of

into the room. If the doors and other windows of the room are closed, or even the air inlet—whatever it is—is not located right in front of the fan, but at right angle, for example—then quite a resistance may have to be overcome to draw the air into the room. The simple exhaust of air through a window thus is usually already a resistance job, and a fan that is not able to develop the necessary static pressure will give only a delusive performance. The closest to the free delivery condition is reached

and, in general outlines, varies as the square of this velocity. As this air velocity is the exact counterpart of the current density in an electric circuit, we can say that the resistance of an air circuit varies as the square of the air current density in the flow section, or in other words, as the square of the air velocity in the air-circuit section. It is for this last reason that the computation of the resistance of an air circuit is much more complicated a problem than the computation of the resistance of an electric circuit.



Axonometric Diagram of Exhaust Duct Installation with 36-inch De Bothezat Disc Pressure Fan in Lackawanna Laundry, Jersey City, New Jersey.

the aeroplane. And no one should be surprised at such state of affairs.

In order to complete our analogy between the generator of air flow, viz., the fan, and the generator of electric current, the following further remarks are necessary.

Distinction Between Electric Generator and Air Flow Generator

A fan can usually be short-circuited without any harm. This happens under the so-called free delivery conditions of operation. But attention must be drawn to the fact that what appears to be free delivery condition often proves on closer analysis not to be so in reality. Thus, when the fan is exhausting air through a window in a room, this is not free delivery, because we must consider how the air exhausted must consider how the air exhausted through the window gets

by a fan operating in the middle of a large room, simply circulating the air around itself.

Thus, a fan is similar to an electric generator with a high interior resistance. The dynamos and alternators are electric generators with a small interior resistance and cannot be short-circuited. But a dry battery has a high interior resistance and resembles more closely the generator of air flow in that respect.

Distinction Between Electric Circuit and an Air Circuit

There is also another factor to consider. Electric resistance does not depend upon the intensity of the electric current that traverses it—so far as temperature variations can be neglected. But the resistance of air circuit does depend upon the air velocity in the cir-

Richardson & Boynton Company Increases Its Executive Staff

At a meeting of the board of directors of the Richardson & Boynton Company, manufacturers of heating appliances and equipment, held Monday, January 16, in the company's offices in New York, the executive personnel was increased by the election of two additional vice presidents. This increase was made because of the enlargement of the company's activities arising from the recent purchase of the former Utica Heater Company, and because of the rapid growth of the company's business volume.

The officers elected are as follows: D. Rait Richardson, President; H. T. Richardson, Vice President in charge of sales; Roger Williams, Vice President in charge of production; D. S. Richardson and A. P. Richardson, Vice Presidents; Joseph Loskill, Secretary, and Arthur Nichols, Treasurer.

Bateman Heating & Metal Company Enters Business

The Bateman Heating & Metal Company, 309 Edmond Street, St. Joseph, Missouri, has opened a sheet metal shop recently and will work in everything in heating, ventilating and sheet metal work, including electric signs.

T. E. Bateman, Thomas Lanham and John Nims are in active management of the business.

Armstrong Furnace Company, London, Ohio, Organized

*Will Manufacture Furnaces Exclusively—Thomas
& Armstrong to Make Sheet Metal Products*

THE Armstrong Furnace Company, of London, Ohio, is announced as a new corporation to greatly enlarge and to carry on the steel furnace business of the Thomas & Armstrong Company of that place. M. B. Armstrong, originator of Armstrong furnaces, is president of the new company, but will also retain his connection with the Thomas & Armstrong Company. R. W. Boyd, a banker of London, who is treasurer of the Thomas & Armstrong Company, will be treasurer and a director in the Armstrong Furnace Company.

The Armstrong Furnace Company with an authorized capital of \$750,000 has taken over the furnace assets and entire plant of the Thomas & Armstrong Company and will erect foundries and greatly enlarge its production facilities for the making of steel furnaces in greater number.

The farm line and other sheet metal products of the Thomas & Armstrong Company will be carried on by that same company and enlarged by reason of the capital gained from the sale of its furnace business to the Armstrong Furnace Company. The Thomas & Armstrong Company have not fully decided exactly where they will locate. They have several flattering offers in London and nearby cities.

M. B. Armstrong will act as president of both corporations and will divide his time between them. He expects to associate with himself in the furnace industry men experienced in that kind of manufacture.

Armstrong furnaces are well known to the trade and the Armstrong factory is to be greatly improved for the economical manufacture of high-grade heaters of boiler plate and boiler type construction. "Martie" is also a well-known and well-liked personality in the furnace industry. His many friends will re-

joice with him in his success in interesting large capital in the enlargement and development of his furnace business.

Mr. Armstrong claims that his factory is now the second largest



M. B. Armstrong

producer of steel furnaces in America and he will not be content until he has reached first place or can at least claim equality with the largest of those engaged in this particular line of construction.

Down Draft Difficulty Caused by Leaky Flue

William F. Ripley, manager of the Lansing, Michigan, branch office of the Home Furnace Company, offers a solution to the two chimney problems that appeared in recent issues of AMERICAN ARTISAN. He writes as follows:

TO AMERICAN ARTISAN:

"I notice in your issue of January 21 your article which states that one of your readers is having trouble with a down draft, you also had someone in Cincinnati a short time ago who was having the same trouble.

"I have this problem come up occasionally and all there is to it is that they have a leaky flue which causes this down draft. The 7-inch smoke pipe that the reader states was connected to the chimney is not doing this draft any good.

"I know what the reader is going to say. Try and tell them the cause is in the chimney. 'The best mason in the city built the flue.' The best way to handle one of these cases, I have found, is by running the smoke pipe from the furnace out through the cellar window and up at least three and one-half feet above the highest point of the roof. This turns the trick every time.

"The chimney is the first place to look for many troubles, such as: no heat, smoke out the feed door, warm basements, and a number of other complaints I have traced back to a defective flue."

How Eliminate Dripping of Creosote from Chimney?

TO AMERICAN ARTISAN:

I have mailed a rough sketch of a home in which we are having considerable trouble in the leaking of creosote from the chimney; it is very bad, and we would welcome a word from you as to how to overcome this trouble.

The flue is of brick (red) construction, and is at the end of the roof, which is square pitch, and there are no trees to interfere with the draft.

This action has become chronic with this flue, and we have tried everything we know of, and now would ask you to please advise what you think could be done in order that this trouble can be avoided.

The furnace is of a well-known make of the latest type, which burns wood as well as coal; the owners in this case use wood all together of good quality.

As one of your subscribers, I would appreciate it very much if you will advise me of some method whereby this leaking of creosote may be overcome.

H. M. ROBLIN.
Brighton, Ontario.

Floral City Heater Company Establishes Chicago Warehouse

The Floral City Heater Company, Monroe, Michigan, announce through their Chicago manager, D. G. Wheeler, that they have secured warehouse facilities on the south side of the city and will in the future make all shipments in the territory served by the Chicago branch from that city, instead of Monroe, Michigan.

It is announced that several carloads of furnaces and boilers will always be kept on hand for immediate shipment. The Chicago office, however, remains at 1654 Monadnock Building.

Universal Humidifying Company, Philadelphia, Changes Name and Location

The Universal Humidifying Company has changed its name to Universal Humidifier Corp., and has moved its principal headquarters from 2013 Sansom Street, Philadelphia, to the Denckla Building, Philadelphia.

This office will be in charge of William G. Braemer.

The Universal Humidifier Corporation also announces the opening of a sales office at 39 Cortlandt Street, New York City, this office being in charge of Mr. Van Richards who will function as sales manager of the company.

The company will continue to manufacture and sell the Braemer portable electric humidifiers and the Thico humidifiers.

List of Exhibitors at the Nebraska Retail Hardware Convention

American Range Corporation, Shakopee, Minnesota.

American Steel & Wire Company, Chicago, Illinois.

American Stove Company, St. Louis, Missouri.

Copper-Clad Malleable Range Company, St. Louis, Missouri.

Florence Stove Company, Kansas City, Missouri.

Fox Furnace Company, Elyria, Ohio.

Gem City Stove Company, Quincy, Illinois.

Green Foundry & Furnace Works, Des Moines, Iowa.

Hibbard, Spencer, Bartlett & Company, Chicago, Illinois.

Howard Stove & Furnace Company, Ralston, Nebraska.

Lennox Furnace Company, Marshalltown, Iowa.

Majestic Manufacturing Company, St. Louis, Missouri.

Malleable Iron Range Company, Beaver Dam, Wisconsin.

Milwaukee Corrugating Company, Milwaukee, Wisconsin.

L. J. Mueller Furnace Company, Milwaukee, Wisconsin.

Northwestern Metalware Company, Minneapolis, Minnesota.

Perfection Stove Company, St. Paul, Minnesota.

Pittsburgh Steel Company, Pittsburgh, Pennsylvania.

Pioneer Paint & Glass Company, Omaha, Nebraska.

Quincy Stove Manufacturing Company, Quincy, Illinois.

Rock Island Stove Company, Rock Island, Illinois.

Standard Furnace & Supply Company, Omaha, Nebraska.

United States Register Company, Kansas City, Missouri.

Mr. and Mrs. R. C. Walker Arrive Safely in Los Angeles After 12-Day Motor Trip

The many friends of R. C. Walker, formerly manager of the Meyer Furnace Company, Peoria, Illinois, will be interested to know that Mr. and Mrs. Walker are spending the winter in California. A short note from Mr. Walker informs us that their address for the time being will be 1112 North Kingley Drive, Los Angeles. Mr. Walker did say that he and Mrs. Walker had driven to California from Peoria, taking the southern route and traveling in all 2,750 miles. They were twelve days on the road and had the good fortune not to have had any very serious trouble en route with either the machine or the roads. Mr. Walker did not say whether he had a connection in the west or not.



Master Sheet Metal Contractors' Association of Wisconsin, Republican Hotel, Milwaukee, Wisconsin, February 6 and 7, 1928. L. F. Reinke, 514 Market Street, Milwaukee, Wisconsin, secretary.

Michigan Retail Hardware Association, Detroit, February 7-10. The Statler Hotel will be headquarters. A. J. Scott, secretary, Marine City.

Wisconsin Retail Hardware Association, Auditorium, Milwaukee, February 7-10. P. J. Jacobs, secretary, Stevens Point.

Iowa Retail Hardware Association, Des Moines, February 14-17. A. R. Sale, secretary, Mason City.

Illinois Retail Hardware Association, February 14, 15 and 16, at the Sherman Hotel, Chicago. Leon D. Nish, secretary, 14-16 North Spring Street, Elgin.

Pennsylvania and Atlantic Seaboard Hardware Association, Philadelphia Commercial Museum, February 14-17. Sharon E. Jones, secretary, Wesley Building, Philadelphia.

Carolinas-Virginia Sheet Metal Contractors' Association, Charlotte, North Carolina, February 15 and 16. Secretary George I. Ray, Charlotte, North Carolina. Convention headquarters at Chamber of Commerce. Convention will be held in Hotel Charlotte.

Minnesota Retail Hardware Association, New Municipal Auditorium, Minneapolis, February 21-24. C. H. Casey, manager, Nicollet at 24th Street, Minneapolis.

Ohio Hardware Association will hold its 1928 convention and exhibit at Toledo, February 21-24. James B. Carson, secretary, 411 Mutual Home Building, Dayton.

South Dakota Retail Hardware Association, Coliseum Building, in Sioux Falls, February 27, 28, 29, 1928. Charles H. Casey, Secretary, Nicollet at 24th Streets, Minneapolis.

Michigan Sheet Metal & Roofing Contractors' Association, Kalamazoo, Michigan, March 5, 6, 7, 8, 1928. Secretary, Frank E. Ederle, 1121 Franklin Street, Grand Rapids, Michigan.

Iowa Sheet Metal Contractors' Association short course to be held at the university at Ames, Iowa, March 14, 15 and 16, 1928.

Illinois Sheet Metal Contractors' Association, Fort Armstrong Hotel, Rock Island, April 11 and 12. Secretary Fred J. Graeff, 222 East Washington Street, Springfield, Illinois.

National Warm Air Heating and Ventilating Association, Hotel Stevens, Chicago, Illinois, April 24, 25 and 26, 1928. Secretary Allen W. Williams, 174 East Long Street, Columbus, Ohio.

National Association of Manufacturers of Heating and Cooking Appliances, Hotel Statler, Detroit, Michigan, May 9 and 10. Secretary Allen W. Williams, 174 East Long Street, Columbus, Ohio.

Consumption of Finished Steel Continues Upward—Price Tendency Is Strong

Pig Iron Buying Is Slack—Shading of Nonferrous Prices Develops

IN both pig iron and finished steel the trend of consumption continues up. January steel ingot output will show further improvement and the unfilled tonnage statement of one concern for January 31 is expected to reveal a moderate increase despite the fact contracting has been subordinated to specifying and the wave of 1928 rail buying is subsiding.

Starting the year at a considerably lower level than in 1927, production has overcome this handicap and almost registered the gain looked for at this season. Steel corporation subsidiaries are operating this week at about 85 per cent, contrasted with 83 per cent last week and 86 per cent a year ago. The industry as a whole, at just over 80 per cent, is only a few points below last year's gait. The Chicago district, again the pace-maker, is 5 per cent better than a year ago.

Several soft spots have developed, notably dragging specifications for sheets and tin plate in the Mahoning valley, but the strengthening price tendency is regarded as a corrective. All wire products save fencing have been marked up \$2 per ton.

Pig Iron

The Pittsburgh pig iron market is devoid of inquiries and sales activity. The recent purchase by one concern of a round tonnage was the last sale of any size noted. Jobbing foundries are getting slightly busier, and their specifications are improving.

Steel companies are operating at a better rate, using more of their own iron, thus withdrawing supplies from the merchant market. However, \$17.25, base, valley, still is available. Malleable also is quoted at \$17.25. A few small lots are sold from time to time at this price.

Basic is firm at \$17 and bessemer \$17.75, valley. These prices are close to the indicated average for January. One furnace sold 150 tons of bessemer iron over the entire week. A concern in Salem, Ohio, sustained a fire loss Sunday night, estimated at \$250,000 to \$500,000, and one valley pig iron shipper is consequently deprived of an outlet for a fairly large tonnage.

At Chicago, first quarter contract business in northern pig iron is being closed up gradually, and active spot buying also is reported. Shipments are showing a slight increase over the heavy rate noted through January. Many buyers are turning their attention to second quarter business.

A number of heavy tonnages were sold in the past week in the Milwaukee district. It is understood plans to collect orders for a cargo of iron from the East in the second quarter have been abandoned because of the prices now asked for eastern iron. Furnaces in this district are holding to \$18.50, base, Chicago.

At Birmingham, pig iron consumers are slow in accepting shipments on contracts placed in the past several weeks. Production will be reduced shortly by blowing out one concern's Number 1 city furnace. A little later another company will blow out its furnace. They are to be rebuilt on a larger scale.

Copper

Large copper export sales were made a week ago at 14.50 cents c.i.f. European ports, but in the past few days the market has been quiet. Export business helped to make the domestic market firmer and some metal sold at 14.12½ cents, Connecticut, but it was not large. Mid-western prices are mostly about ⅓ cent over this price. On prompt

shipment metal probably these two quotations could be shaded slightly.

Lead

Lead prices have held practically unchanged for several weeks while a moderate amount of business has been done.

Tin

Recent strength of tin has been replaced by easiness and the market has fallen below 55.00 cents again. Some active days have been noted in the market but as a whole business with consumers was light the past week.

Users appear well covered for two months or so ahead and in some instances longer. Supplies are liberal although not excessive. The professional trade appears perplexed by the erratic price fluctuations lately.

Zinc

Prime western zinc has advanced a few points from 5.62½ cents, East St. Louis, to 5.67½ cents and 5.70 cents. Business has not been large. Firmness in the ore market influenced the advance. Prices of high grade zinc are unchanged but supply is increasing.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, \$35.00; Commercial 45-55, \$32.00; plumbers', \$29.00; all per 100 pounds.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, \$15.50 to \$16.00; old iron axles, \$21.00 to \$21.50; steel springs, \$14.75 to \$15.25; No. 1 wrought iron, \$11.00 to \$11.50; No. 1, cast, \$12.75 to \$13.25, all per net tons. Prices for non-ferrous metals are quoted as follows, per pound: Light copper, 9 cents; zinc, 3½ cents; cast aluminum, 13¾ cents.



LA FONTAINE

Scene of another triumph o'er rust-fire *

HIRAM ELDER, who designed this La Fontaine (Indiana) School, is a far-seeing architect. He builds for permanence. That's why he specified ARMCO Ingot Iron gutters, downspouts and cornices in 1910.

For ARMCO Ingot Iron has the characteristic of carrying on long after ordinary sheet metals have given up the unequal struggle. It's the survival of

the *purest*—and ARMCO Ingot Iron is the purest iron made.

Wouldn't you like to point proudly to a job like the La Fontaine School and say to your prospects: "There's an example of my work...I did it seventeen years ago with rust-resisting ARMCO Ingot Iron?"

You can! And just think what it means. One ARMCO Ingot Iron job leads to another. More business, bigger profits!

ARMCO Distributors Ass'n of America

Executive Offices, Middletown, Ohio



ARMCO
INGOT IRON
RESISTS RUST



Here **RUST-FIRE** is retarded. The only difference between rusting and burning is time—both are oxidation. You can feel and see the fire produced by rapid burning. But when metal rusts, the process is too slow to see. Rust is the "ash" of this fire.

Mention **AMERICAN ARTISAN** in your reply—Thank you!

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and Hardware prices corrected weekly

METALS

PIG IRON	
Chicago Fdy., No. 2	\$18 50
Southern Fdy. No. 2	22 01
Lake Superior Charcoal	27 04
Malleable	18 50

FIRST QUALITY BRIGHT TIN PLATES	
1C 20x28 112 sheets	\$25 10
IX 20x28	29 60
IXX 20x28 56 sheets	16 20
IXXX 20x28	17 55
IXXXX 20x28	18 95

TERNE PLATES	
IC 20x28, 40-lb. 112 sheets	25 00
IX 20x28, 40-lb. 112 sheets	27 75
IC 20x28, 35-lb. 112 sheets	21 15
IX 20x28, 35-lb. 112 sheets	23 80
IC 20x28, 20-lb. 112 sheets	19 55
IV 20x28, 20-lb. 112 sheets	22 05
IC 20x28, 15-lb. 112 sheets	18 05

"ARMCO" INGOT IRON PLATES	
No. 8 ga. up to and including 1/4 in.—100 lbs.	\$4 55

COKE PLATES	
Cokes, 80 lbs., base, 20x28	\$13 60
Cokes, 90 lbs., base, 20x28	13 80
Cokes, 100 lbs., base, 20x28	14 00
Cokes, 107 lbs., base, IC 20x28	14 30
Cokes, 125 lbs., base, IX 20x28	16 40
Cokes, 155 lbs., base, 56 sheets	9 20
Cokes, 175 lbs., base, 56 sheets	10 05
Cokes, 195 lbs., base, 56 sheets	10 90

BLUE ANNEALED SHEETS	
Base 10 ga.per 100 lbs.	\$3 50
"Armco" 10 ga.per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK	
No. 18-20.per 100 lbs.	\$3 75
No. 22.per 100 lbs.	3 90
No. 24.per 100 lbs.	3 95
No. 26.per 100 lbs.	4 05
No. 27.per 100 lbs.	4 10
No. 28.per 100 lbs.	4 20
No. 29.per 100 lbs.	4 35
No. 30.per 100 lbs.	4 45

"ARMCO" GALVANIZED	
"Armco" 24.per 100 lbs.	\$6 15

GALVANIZED	
No. 16.per 100 lbs.	\$4 30
No. 18.per 100 lbs.	4 45
No. 20.per 100 lbs.	4 60
No. 22.per 100 lbs.	4 65
No. 24.per 100 lbs.	4 80
No. 26.per 100 lbs.	5 05
No. 27.per 100 lbs.	5 15
No. 28.per 100 lbs.	5 30
No. 30.per 100 lbs.	5 70

BAR SOLDER	
Warranted 50-50.per 100 lbs.	\$35 00

Commercial	
45-55.per 100 lbs.	32 00
Plumbers.per 100 lbs.	29 00

ZINC	
In Slabs.per 100 lbs.	\$ 8 50

SHEET ZINC	
Cash Lots (600 lbs.).	\$12 00
Sheet Lots.	13 00

BRASS	
Sheets, Chicago base.	17 1/2 c
Mill base.	18 c
Tubing, seamless base.	26 1/2 c
Wire, base.	18 1/2 c
Rods, base.	15 1/2 c

COPPER	
Sheets, Chicago base.	22 1/2 c
Mill base.	21 1/2 c
Tubing, seamless base.	25 1/2 c
Wire, No. 9, B & S Ga.	18 1/2 c
Wire, No. 10, B & S Ga.	19 c
Wire, No. 11, B & S Ga.	19 1/2 c
Wire, No. 3, B & S Ga. and heavier.	18 1/2 c

LEAD	
American Pig.	\$7 30
Bar.	8 30

TIN	
Pig Tin.per 100 lbs.	\$62 00
Bar Tin.per 100 lbs.	63 00

ASBESTOS	
Paper up to 1/16.	6c per lb.
Roll board 3/32 to 1/2.	6 1/2 c per lb.
Mill board 3/32 to 1/2.	6c per lb.
Corrugated Paper (250 sq. ft. to roll).	\$6 00 per roll

BRUSHES	
Hot Air Pipe Cleaning Bristle, with handle, each	\$0 85

BURRS	
Copper Burrs only.	40-55c

CEMENT, FURNACE	
American Seal, 5-lb. cans, net	\$ 40
American Seal, 10-lb. cans, net	50
American Seal, 25-lb. cans, net	2 00
Pecora.per 100 lbs.	7 51

CHIMNEY TOPS	
Adams' Revolving	
Wt. Doz. Price Doz.	
4 in.21 lbs.	\$11 00
6 in.24 lbs.	11 50
7 in.30 lbs.	13 50
8 in.33 lbs.	15 00
9 in.51 lbs.	16 50
10 in.56 lbs.	18 00
12 in.66 lbs.	22 00
14 in.110 lbs.	36 00

CLINKER TONGS	
Front Rank, each.	\$0 75
Per doz.	8 40

CLIPS	
Damper Adams No-Rivet Steel, with tail pieces, per gross.	\$9 00
Tail pieces, per gross.	2 50

COPERS—Soldering	
Pointed Roofing	
3 lb. and heavier.per lb.	40c
2 1/2 lb.per lb.	45c
2 lb.per lb.	48c
1 1/2 lb.per lb.	55c
1 lb.per lb.	60c

CORNICE BRAKES	
Chicago Steel Bending	
Nos. 1 to 6B.	Net

CUT-OFFS	
Gal., plain, round or cor. rd.	
26 gauge.	30c
28 gauge.	35c

DAMPERS	
"Yankee" Hot Air	
7 inch, each 20c, doz.	\$1 75
8 inch, each 25c, doz.	2 40
9 inch, each 30c, doz.	2 75
10 inch, each 32c, doz.	3 00

Smoke Pipe	
7 inch, each.	\$0 35
8 inch, each.	40
9 inch, each.	50
10 inch, each.	60
12 inch, each.	90

ADAMS No. 1 CHECK	
Check and Collar Complete	
8 inch, each.	2 00
9 inch, each.	2 25
End Check Only	
8 inch, each.	1 60
9 inch, each.	1 85
Collar Only	
8 inch, each.	50
9 inch, each.	65

No. 2 CHECK	
8 inch, each.	1 00
9 inch, each.	1 00
10% Disc. on Adams No. 1 and No. 2 Check	
Diamond Smoke Pipe	
7 inch, doz.	\$ 2 00
8 inch, doz.	3 20
9 inch, doz.	4 80
10 inch, doz.	6 00

Adams' Sheet Metal	
7 inch, doz.	\$ 1 60
8 inch, doz.	2 20
9 inch, doz.	3 60
10 inch, doz.	3 80
12 inch, doz.	3 50
14 inch, doz.	5 00

DIGGERS	
Post Hole Iwan's Split Handle (Eureka)	
4-ft. Handle.per doz.	\$14 00
7-ft. Handle.per doz.	36 00
Iwan's Hercules pattern, per doz.	14 90

EAVES TROUGH	
Galv. Crimpedge, crated 75 & 5% Zinc, "Barnes".	60%

ELBOWS	
Conductor Pipe	
Galv. plain or corrugated, round flat Crimp.	
28 Gauge.	60%
26 Gauge.	45%
24 Gauge.	15%

Galv. & Terne Steel	
Plain Rd. and Rd. Corr.:	
28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated	
No. 28 Gauge.	50%
26 Gauge.	35%

Portico Elbows	
Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested.	70 & 5%
Nested Solid.	70 & 5%

Sq. Corr., A. & B. & Octagon	
28 Ga.	50%
26 Ga.	35%

Portico	
1", 1 1/4", 1 1/2".	45%

Copper	
16 oz., all designs.	50%

Zinc—	
All styles.	60%

ELBOWS—Stove Pipe	
1-piece Corrugated, Uniform Blue "Milcor" No. 28 Gauge. Doz.	
5-inch.	\$1 05
6-inch.	1 20
7-inch.	1 75

Special Corrugated	
6-inch.	\$1 00
7-inch.	1 60

Adjustable—Uniform Blue	
"Milcor" No. 28 Gauge. Uniform Blue.	
5-inch.	\$1 65
6-inch.	1 75
7-inch.	2 10

WOOD FACES—50% off list.	
726-6-12 1/2% (100 rods)....	\$28 68
1948-6-14 1/2% (100 rods)....	48 62

FILES AND RASPS	
Heller's (American)	50-10%
American.	60-10%
Arcade.	50%
Black Diamond.	50%
Eagle.	50%
Great Western.	50%
Kearney & Foot.	50%
McClellan.	50%
Nicholson.	50%
Simonds.	60%

FIRE POTS	
Clayton & Lambert's	
East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Arizona, San Angelo and Laredo, Texas.	52
West of above boundary.	48%

Geo. W. Diener Mfg. Co. Ea.	
No. 02 Gasoline Torch, 1 qt.	\$ 5 55
No. 0250, Kerosene, or Gasoline Torch, 1 qt.	7 50
No. 10 Tinner's Furn. Square tank, 1 gal.	12 60
No. 16 Tinner's Furn. Round tank, 1 gal.	12 00
No. 21 Gas Soldering Furnace.	3 60
No. 110 Automatic Gas Soldering Furnace.	10 50

Double Blast Mfg. Co.	
Gasoline, Nos. 25 and 36.	60%

Quick Meal Stove Co.	
Vesuvius, F. O. B. St. Louis 30% (Extra Disc. for large quantities.)	

GALVANIZED WARE	
Pails (Galv. after made), 10-qt.	\$2 12
Tubs (Galv. after made), No. 1.	6 00
No. 2.	6 35

GLASS	
Single Strength, A, 52-in. brackets.	87%
Single Strength, A, 34 to 40-in. bracket.	86%
Single Strength, A, all other brackets.	89%
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(Continued on Page 36)



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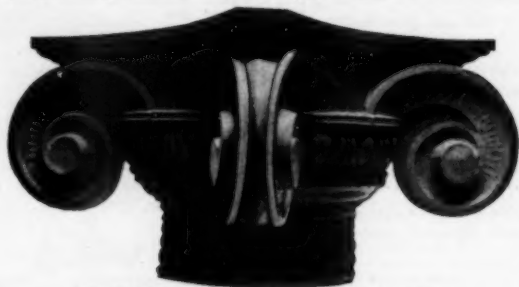
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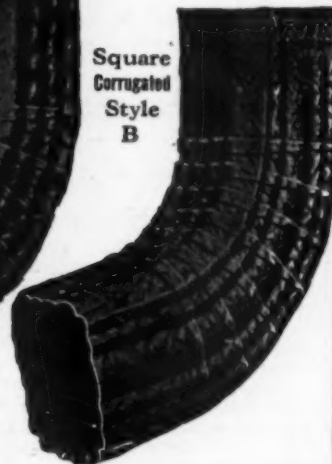
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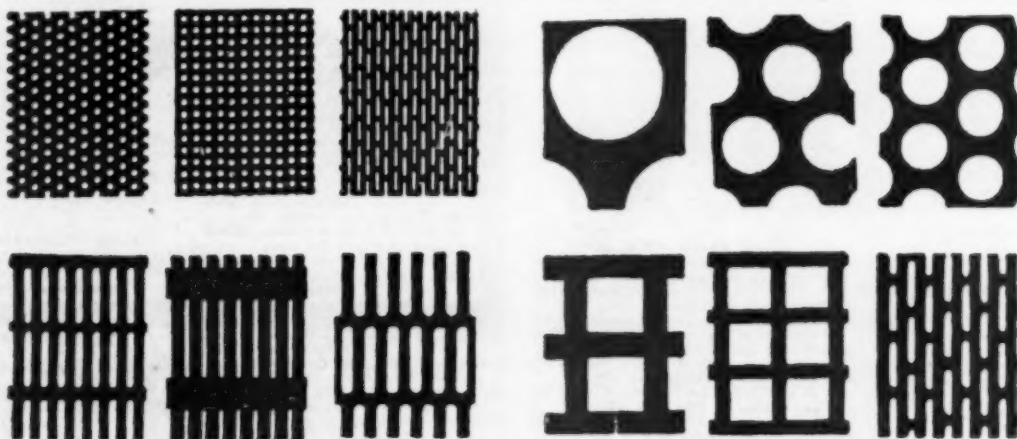


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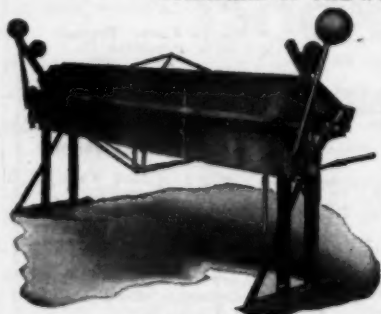
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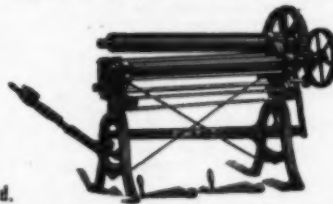
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Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
- Roofing—Tin.**
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
- Roofing—Zinc.**
New Jersey Zinc Sales Co., The, New York, N. Y.
- Rubbish Burners.**
Hart & Cooley Co., New Britain, Conn.
- Sal-Ammoniac.**
Special Chemicals Co., Waukegan, Ill.
- Schools—Sheet Metal Pattern Drafting.**
St. Louis Technical Institute, St. Louis, Mo.
- Schools—Warm Air Heating.**
National Heatercraft Institute, Peoria, Ill.
St. Louis Technical Institute, St. Louis, Mo.
- Screws—Hardened Metallic Drive.**
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., 354 West 13th St., New York
- Screws—Hardened Self-Tapping.**
Sheet Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., 354 West 13th St., New York
- Screens—Perforated Metal.**
Harrington & King Perforating Co., Chicago, Ill.
- Shears—Hand and Power.**
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Unishear Co., Inc., New York, N. Y.
Viking Shear Co., Erie, Pa.
- Sheet Metal Screws—Hardened.**
Self-Tapping.
Parker-Kalon Corp., 354 West 13th St., New York
- Sheets—Black and Galvanized.**
Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Central Alloy Steel Corp., Massillon, Ohio
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
- Sheets—Iron.**
Armco Distributors Ass'n of America, Middletown, Ohio
Central Alloy Steel Corp., Massillon, Ohio
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
- Sheets—Tin.**
Merchant & Evans Co., Philadelphia, Pa.
Taylor Co., N. & G., Philadelphia, Pa.
- Sheets—Zinc.**
New Jersey Zinc Sales Co., The, New York, N. Y.
- Shingles and Tiles—Metal.**
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Wheeling Corrugating Co., Wheeling, W. Va.
- Shingles—Zinc.**
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Sifters—Ash.**
Diener Mfg. Co., G. W., Chicago, Ill.
- Sky Lights.**
Lupton's Sons Co., David, Philadelphia, Pa.
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- Snips.**
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Ryerson & Son, Inc., Jos. T., Chicago, Ill.
- Solder.**
Chicago Solder Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Soldering Furnaces.**
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
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Ryerson & Son, Inc., Jos. T., Chicago, Ill.
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Special Chemicals Co., Waukegan, Ill.
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Fanner Mfg. Co., Cleveland, Ohio
- Statuary.**
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- Stove Pipe Reducers.**
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- Stoves—Camp.**
Quick Meal Stove Co., St. Louis, Mo.
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Taylor Co., N. & G., Philadelphia, Pa.
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Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
- Torches.**
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
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Sheet Steel Trade Extension Committee, Pittsburgh, Pa.
- Trimings—Stove.**
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Akrot Ventilators, Inc., Chicago, Ill.
Arex Company, Chicago, Ill.
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Kernchen Co., Chicago, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Standard Ventilator Co., Lewisburg, Pa.
Sturtevant Co., Boston, Mass.
- Ventilators—Ceiling.**
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- Wire Hoops.**
American Steel & Wire Co., Chicago, Ill.
- Wire Rope.**
American Steel & Wire Co., Chicago, Ill.
- Zinc.**
Merchant & Evans Co., Philadelphia, Pa.
New Jersey Zinc Co., The, New York, N. Y.

When writing mention AMERICAN ARTISAN—Thank you!

WANTS AND SALES

Yearly subscribers to the **AMERICAN ARTISAN** may insert advertisements of not more than fifty words in our Want and Sales Columns **WITHOUT CHARGE**.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines, employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

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Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale or Lease—The best paying furnace business in Chicago, northwest side, with a large stock of castings, galvanized and tin plate and fittings, approximately 600 installations in a year. Seven years in present location. It requires \$5,000 to handle. Do not answer unless you have the cash or good security. Address Q-464, **AMERICAN ARTISAN**, 620 S. Michigan Ave., Chicago.

Wanted—A first-class sheet metal worker with small capital to lease my tin shop. Also have for sale a second-hand stove and furniture store. I am 73 years old and want to retire. Address R-464, **AMERICAN ARTISAN**, 620 S. Michigan Ave., Chicago.

For Sale—Half interest in well established combination sheet metal and plumbing shop. 16,000 population. A rapid growing city in the center of the largest oil field in the world. 70 miles southeast of Oklahoma City. Address J. B. Loveless, Box 207, Seminole, Okla. S-464

For Sale—Good plumbing and heating business in Northern Indiana town of 10,000. Fine store, good stock and tools. Leading shop for 40 years. New building. Reason for selling, other business. Address K-465, **AMERICAN ARTISAN**, 620 S. Michigan Ave., Chicago.

For Sale—Complete hardware stock about \$5000.00, good district, will sell or lease building. First class proposition for live hardware man. Address G465, **AMERICAN ARTISAN**, 620 South Michigan Avenue, Chicago.

For Sale—On account of sickness, tin, furnace and radiator shop. Good town and business. No competition. Bargain. Address Tin Shop, Holyoke, Colorado. J-465

SITUATION WANTED

Married man with sixteen years of hardware experience desires a position in hardware store. I am employed at present, but wish to make a change. References can be furnished by present employer. Address P. O. Box 410, Perham, Minn. B-465

SITUATION WANTED

Plumber, steamfitter and furnace man with 18 years' experience wishes to connect with a good reliable firm. Can handle any size job or can run a shop. If you are in need of just such a man get in touch with me. I am married and want a job that I can run as I would my own shop. Do not answer if you do not mean business. Can offer a good, steady and reliable job. Can come any time. State particulars. Address J-464, **AMERICAN ARTISAN**, 620 S. Michigan Ave., Chicago.

Situation Wanted—First-class sheet metal worker and furnace man; also pattern cutter. Engineering knowledge of warm air heating; familiar with Standard Code. 19 years' practical experience at general work. Desire connection with good clean outfit doing good class of work. At least ten months in year and preferably steady year round. Address P. O. Box 175, Elmer, Mo. L-464

Position Wanted—As working foreman. By first class sheet metal worker in all its branches. Such as may come to any first class shop. Can read blueprints and figure work. Have been handling men in all branches of tin and sheet metal work for past twenty years. Can furnish best of references. Address Edward G. Collins, 802 Broad Street, West Durham, North Carolina. P-465

Position Wanted—By tinner and plumber of twenty-five years' experience, sober, industrial and reliable. Can do hot water and steam heating. Install warm air furnaces the Standard Code way. State wages in first letter for steady job. Address Tinner and Plumber, 235 West Homer Street, Freeport, Illinois. O-465

Situation Wanted—By sheet metal worker and furnace installer. Have had 16 years' experience at general sheet metal and roofing work. Am steady and of good habits. Wish steady position with reliable firm. Can come at once. State wages. Address A. R. Burrows, Box 166, Coloma, Mich. K-464

Situation Wanted—By an all-around handy man—plumbing, steamfitting, tin work, house electric wiring, guttering. Finest work and can also help in a hardware store. 14 years' experience. Address A-465, **AMERICAN ARTISAN**, 620 So. Michigan avenue, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—By first-class tinner and furnace man. Can do inside and outside work. 25 years at trade. Nothing but steady job the year around. Am married. Can do anything that comes in any tin shop. Address W. J. Mack, Route 2, Box 90, St. Charles, Ill. G-464

Situation Wanted—By an all around practical tinner with 25 years' experience. Can take charge and run shop. Can read blue prints and estimate all kinds of work. A general shop preferred. Can come at once. Address P. S. McCuffin, Inkster, Mich. H-464

Wanted—Permanent position by all around sheet metal worker and plumber. Capable as foreman. Good layout and production man. Will also accept factory maintenance and efficiency position. Address K-463, **AMERICAN ARTISAN**, 620 So. Michigan avenue, Chicago, Illinois.

Position Wanted—Married man 30 years of age wants steady job in small shop in North Dakota. Understands Standard Code. 10 years' experience as tinner and furnace man. Can come at once. Address M. A. Hunter, 619 6th Street, Bismarck, N. D. L-465

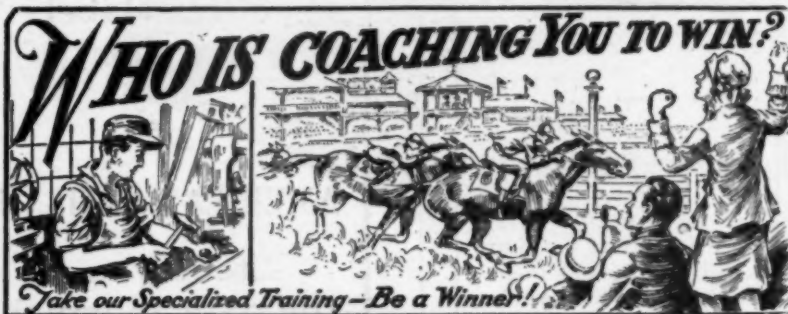
Situation Wanted—By first class sheet metal worker. Can also do plumbing. Address Plumber, 30 East 4th Avenue, Spokane, Washington. M-465

HELP WANTED

Wanted—An experienced Furnace Salesman. One capable of planning and estimating heating systems according to the Standard Code, able to handle replacement work, and figure sheet metal jobs on buildings and from plans. A St. Louis firm offers a steady job to the right man. Address Z-464, **AMERICAN ARTISAN**, 620 So. Michigan avenue, Chicago, Illinois.

Wanted—First Class sheet metal worker. One who is neat and can turn a finished job in a reasonable time. Have a year around job with no lay offs for the right man. Prefer middle-aged married man. Address F-465, **AMERICAN ARTISAN**, 620 South Michigan Avenue, Chicago, Ill.

Wanted—Experienced furnace salesman. Good proposition. Address Louis Bahcall Furnace Co., Inc., 1010 St. Charles Road, Maywood, Ill. M-464



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Yes, Sir! We train you in your own Home, Personal, Clear, Direct. Check your course—write today, before you forget it.

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- ☐ SPECIAL WARM AIR FURNACE HEATING
- ☐ SHEET METAL CONTRACTING & ESTIMATING
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For Sale—1 No. 928 Creasing stake, 1 No. 477 large burring machine with stand, 1 No. 110 groover. All P. S. & W. make and in good condition. Prices on application. Might consider exchange for other tools. Can use No. 546 large turner. No. 545 small turner. No. 550 elbow machine with 1½ in. face. Must be encased, with stands and in good condition. Address Box 216, Saybrook, Illinois. D-465

Tools for Sale—1 No. 4 Packham spiral crimper and beader, nearly new, \$5.00. Big assortment of plumbing tools at a bargain. Tell us what you need and we will make a price. Address Willard Warstler, Goshen, Ind. E-465

Wanted—An 8-foot brake in good condition. Also set of tinnings' tools. State full particulars and lowest price. Address Y-464, AMERICAN ARTISAN, 620 So. Michigan avenue, Chicago, Illinois.

Want to buy a deep throat Hand Lever Shear, also deep throat hand lever punch, capacity No. 10 gauge steel. Address Dean Specialty Works, San Antonio, Texas. X-464

For Sale—One 30-inch Peek, Stow & Wilcox Pipe Grooving Machine in first-class condition. Price \$25.00 C. O. D. Address T-464, AMERICAN ARTISAN, 620 So. Michigan avenue, Chicago, Illinois.

For Sale—One set Niagara double seamers and roofing tongs in good condition; price reasonable. Enquire Redlich & Son, Jerseyville, Ill. C-465

Wanted—One 8 or 10-foot brake. Address Griebenow-Weirich Co., Owen, Wis. P-464



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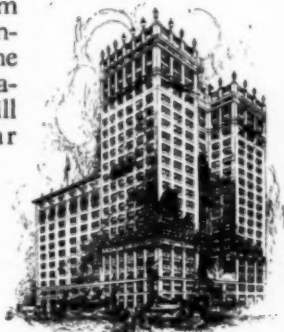
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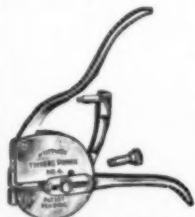


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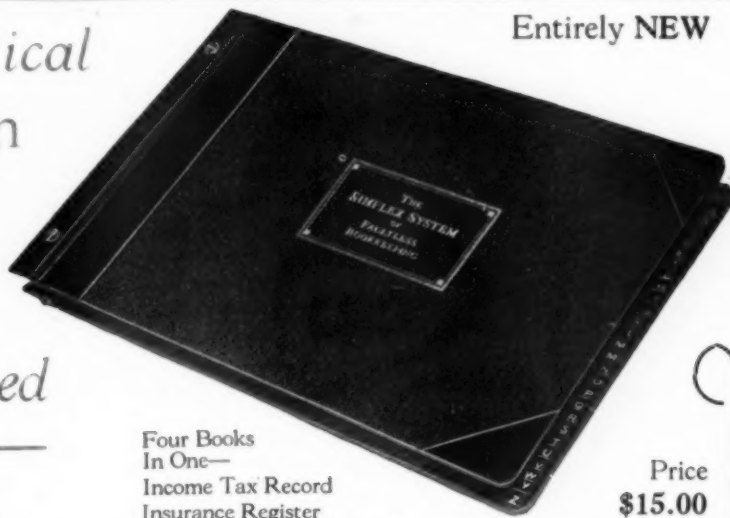
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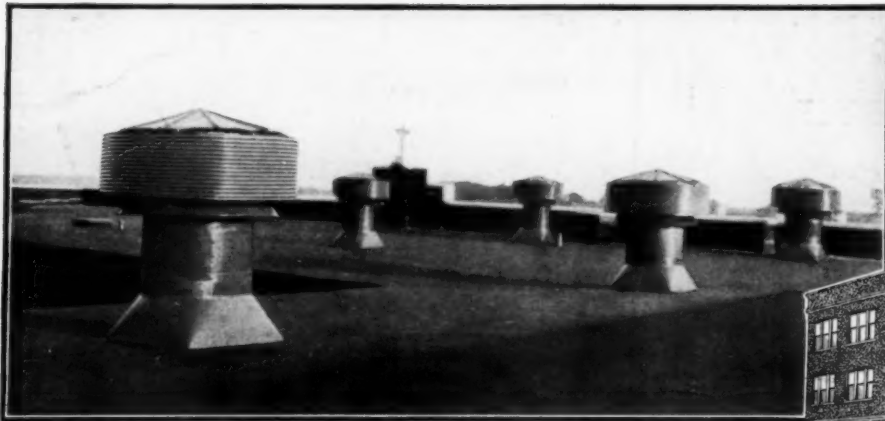
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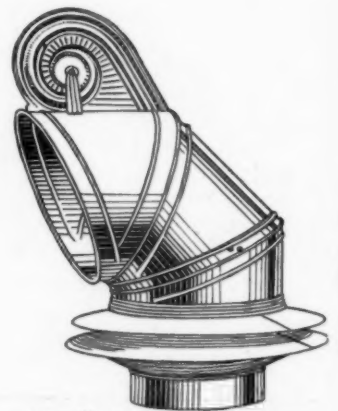
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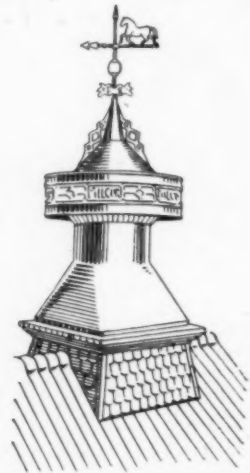
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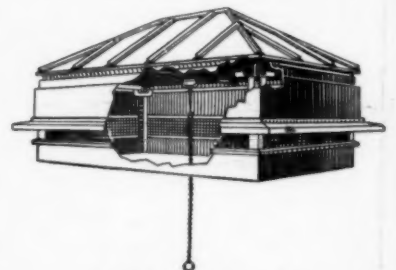
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